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Contractors and Engineers Monthly

Vol. 46, No. 6 JUNE, 1949 $3 a Year, 50 Cents a Copy

Covering the Field

● Rolled-Earth Dam

River diversion, dirt-moving, and spillway excavation at Union Village are covered in the story beginning on this page.

● Winter Fails to Halt Hot-Mix

How 14 miles of asphaltic concrete were laid despite cold weather and traffic is told in an article on this page.

● Major U. S. Bridge Project

It's the Mystic River Bridge in Boston—a high-level double-deck structure for which fourteen major contracts have been awarded. Turn to page 2.

● Levee to Guard Coast Town

Earth dikes held back ocean and river while men and machines dug the levee toe. And by the way, a novel rig called "The Flying Saucer" marked the job—page 5.

● Concrete Paving, at Long Last

Pre-war grading, post-war paving, is the history of this Alternate U. S. route. See page 11 for job details.

● Mud-Pumping Problem

A seal coat of caliche over the subgrade proved to be the solution: no failure 2 years later. See page 16.

● Piles Driven for Ferry

On page 18, keep your eyes on the driving rig and watch those driven-core composite piles go down as the cameraman saw them.

● Engineering Trainees

What makes good ones? What should we look for when we're choosing them? Some specific suggestions on page 29.

● City Airport Upped a Class

Grading, draining, and black-top paving transform what was originally a WPA project, as reported on page 35.

● Portrait in Print

Woe betide the construction industry if it loses that old individualistic spirit, says Contractor H. L. Perkins of Nevada, Mo. A sketch of his career is on page 41.

● Power Plant, Dormitories

Concrete for the new Sydney, Australia, power plant was pumped from a central site. Read page 50.

The dormitories went up fast, thanks to precast concrete slabs (page 86).

● Tunnel on Penn-Lincoln Parkway

Page 58 describes and pictures the rock-drilling, blasting, and mucking cycle now under way in Squirrel Hill Tunnel.

● Road Relocation

Construction agenda included a concrete wall to retain the new roadbed, plus a new concrete and I-beam bridge. See page 64.

● Gas Pipe-Line Job

And a well organized one, too, page 70 records—despite intercepted utilities, hard digging, and fast traffic.

● County Bridge Maintenance

Procedures are systematized, parts are standardized, and short cuts abound in Los Angeles County—account, page 104.

(You will find "In This Issue" on page 4)

Dirt-Movers Build Union Village Dam

Varied Equipment Worked Two 10-Hour Shifts in '48; Concreting in Spillway to Complete Project in 1949

✦ THE 1948 construction season saw the big earth embankment for the Union Village Dam in eastern Vermont rise gradually from the bed of the Ompompanoosuc River to its full height of 170 feet above the valley floor. By the end of 1949, when the concrete weir and retaining wall in the spillway are poured, the flood-control project will be completed. This rolled-earth dam will be a major factor in controlling future floods on the Connecticut River, into which the Ompompanoosuc empties only 4½ miles below the dam site.

Work on the four-year project got under way in 1946 after the Department of the Army, Corps of Engineers, New England Division, awarded the Savin Construction Corp. of East Hartford, Conn., a $2,429,208 contract for the construction. During the first year, a 1,170-foot gate-controlled outlet tunnel, with an inside diameter of 13 feet, was drilled through solid rock along the left river bank to divert the river during construction, and for stream control after the project is completed. In 1947 the tunnel was lined with concrete to a minimum thickness of 12 inches. Last year, 1948, the 1,100-foot-long earth embankment was completed. And this year when the concrete structures are poured, the entire project will be finished. (See C. & E. M., Dec., 1946, pg. 50, for the drilling of the diversion tunnel; June, 1948, pg. 46, for the concrete lining of the tunnel.)

River Diversion

Before any work could start on the earth dam itself, the river had to be diverted from its normal channel in the valley into the newly drilled and lined tunnel. A diversion cofferdam was thrown up across the river at a point just below the entrance to the intake channel of the tunnel. This earth cofferdam had a top elevation of 427, or 7 feet above the flow line of the intake channel. To keep the water from backing up the river and interfering with the construction of the dam, a downstream diversion cofferdam was built with a top elevation of 420, at a point above where the outlet channel from the tunnel runs back into the river.

The river was diverted on May 10, 1948. This was earlier than had been anticipated in the construction schedule, but the relocation of the highway that originally ran up the valley alongside the river was delayed by the spring rains. While the rains did not interfere

(Continued on page 98)

Hot Mix Is Laid In Cold Weather

22-Foot Highway Project Is Built Successfully, Despite Winter Weather, Over 14-Mile Section

✦ A HIGH-TYPE asphaltic-concrete pavement 6 inches thick has recently been completed on Oklahoma State Highway 33 from Kingfisher east for a distance of 14.312 miles. The $600,000 contract, all new construction, was done by the Oklahoma City contracting firm of Ryan-Richards for the Oklahoma State Highway Department.

After beginning the work late in August last year, and despite one of the most unpleasant winters in a decade, Ryan-Richards finished the job on schedule on March 25, 1948, with the exception of a small amount of shouldering and clean-up work. The job included all grading, drainage, construction of two small bridges, a granular base course, and 6 inches of asphaltic concrete from 22 to 23 feet wide placed in three courses.

Several times during the winter, snow and ice caught the job with perhaps a mile of fresh prime oil laid, a

(Continued on page 34)

NEW POWER PLANT DOWN UNDER

THE JOHN CRERAR JUN 20 1949 LIBRARY

In Sydney, Australia, a new 200,000-kw. power station is the answer to the ever-increasing demand for electric power (see page 50). In the stage of steel erection pictured here, the first of two stiffleg cranes has been positioned to handle steel members above the 100-foot level, and two 60-ton boilers have already been hoisted into position on the framework of the boiler house.

Bridge Will Span The Mystic River

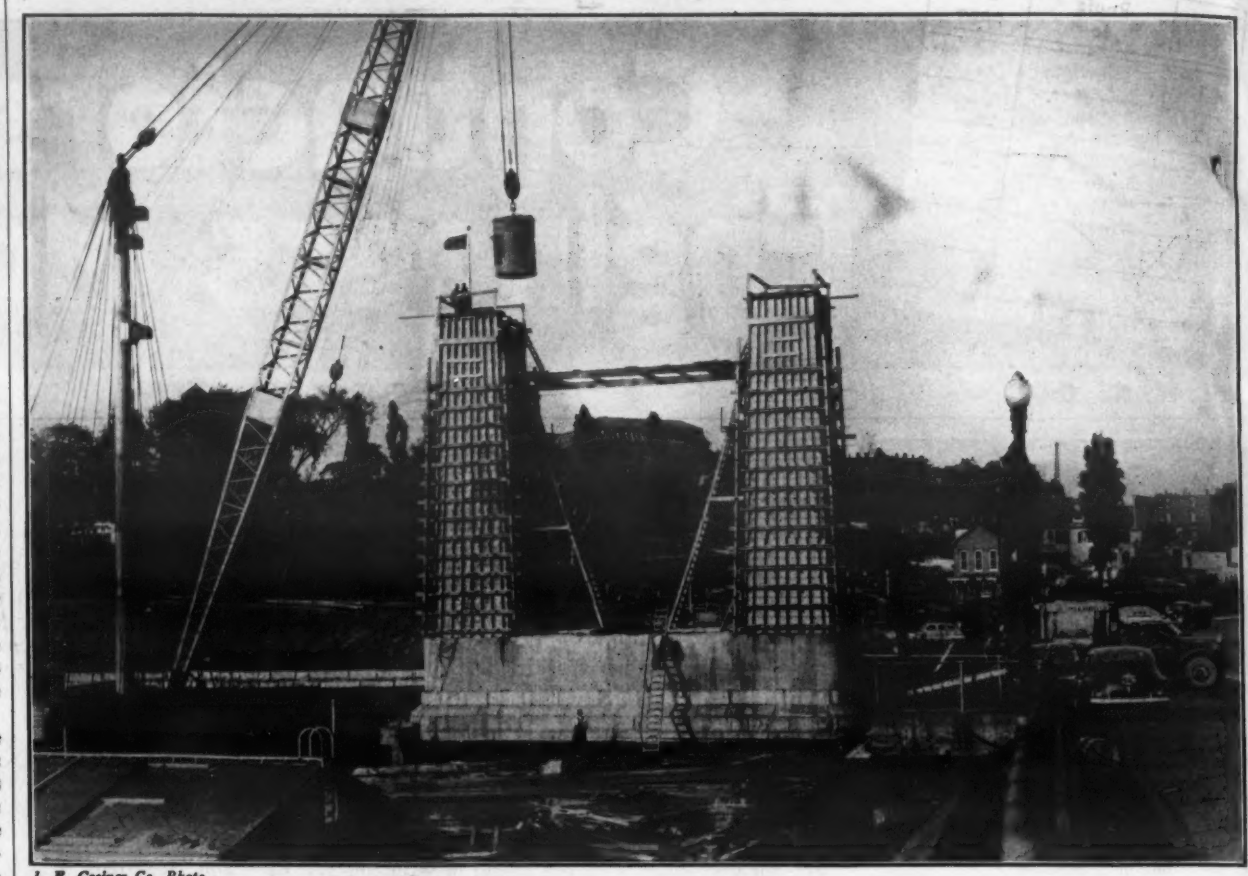
Two-Mile-Long High-Level Span to Cost $27,000,000; Fourteen Main Contracts; River Piers Are on Rock

By WILLIAM H. QUIRK,
Eastern Editor

✦ ONE of the major construction projects now under way in this country is the high-level Mystic River Bridge in metropolitan Boston. This 11,700-foot concrete and steel vehicular structure is being built at a cost of $27,000,000. It will span both the Mystic River and the Little Mystic Channel to connect Charlestown and Chelsea, which lie north of downtown Boston across the Charles River. Work on the big bridge got under way in March, 1948; it is scheduled to be open for traffic in the spring of 1950.

Fourteen major contracts were awarded on the project by the Mystic River Bridge Authority, which was created in May, 1946, by an act of the Massachusetts State Legislature. The act authorizes the construction, maintenance, repair, and operation of a high-level toll bridge between the cities of Boston and Chelsea over the Mystic River and the tracks of the Boston & Maine Railroad.

On this site in 1631, over 300 years ago, the first ferry in New England, and probably the first in North America, plied back and forth across the waters of the Mystic. In 1802 a toll bridge replaced the ferry. Rebuilt in 1873, this first bridge lasted until 1910. Then it was replaced with the present structure which will now, in turn, be superseded by the new toll bridge.



J. E. Greiner Co. Photo

Merritt-Chapman & Scott built the three river piers for the main channel span of the new Mystic River Bridge. This is pier M4.

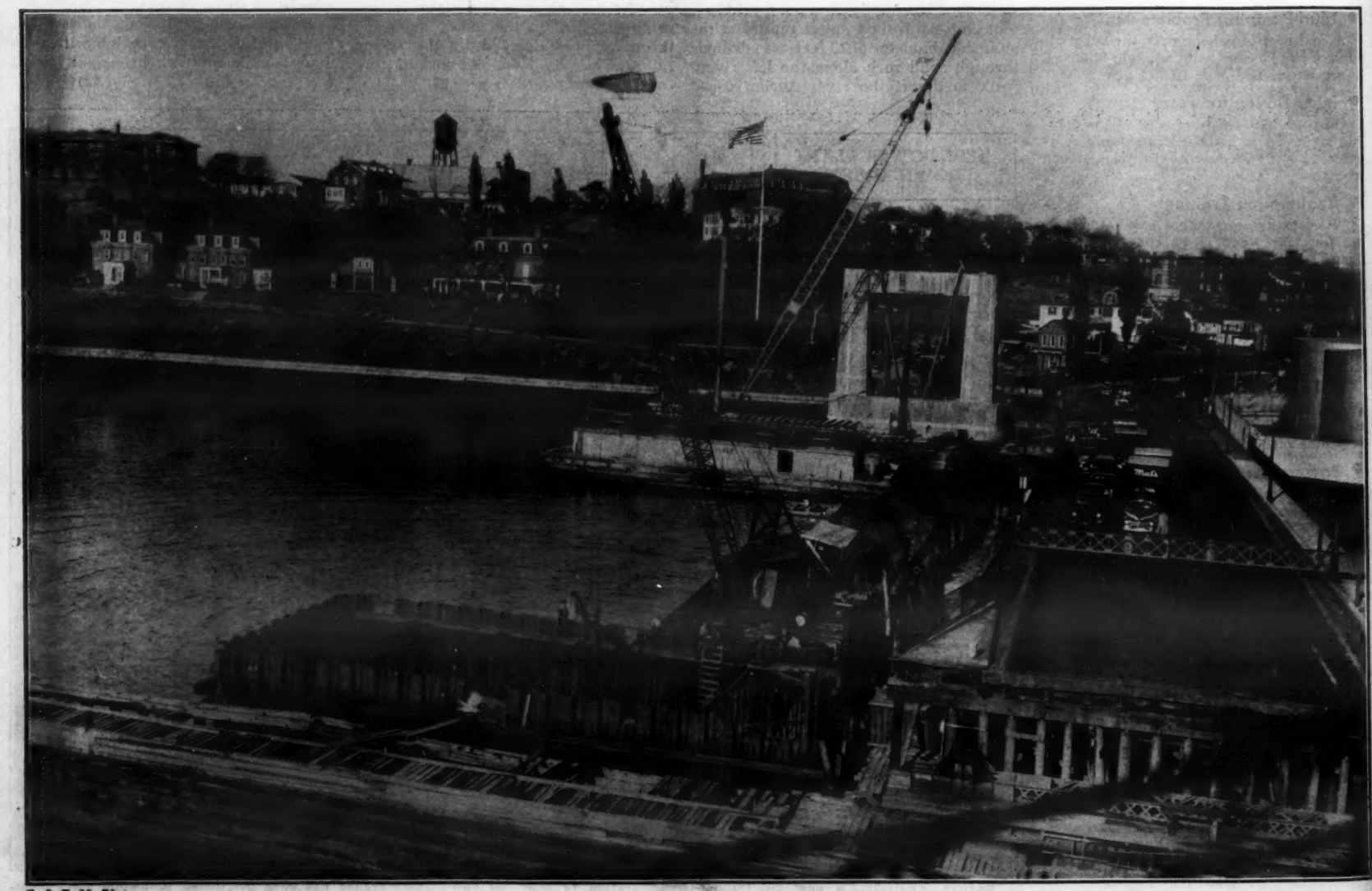
The existing bridge serves traffic between the thickly populated north-shore area of metropolitan Boston and the central business section of the city. It is one of the major transportation links in the arterial highway system of the area. But frequent openings of the draw span over the Mystic River channel result in considerable highway-traffic delays and severe traffic congestion. When the bridge opens, traffic backs up several blocks in each direction and congests entire city areas 'round about.

Existing Structures

Beginning at its southern end in Charleston, where the Bunker Hill monument and the U. S. Navy Yard are located, the existing structure first spans the Little Mystic Channel on what is known as the Chelsea South Bridge. It then crosses over a jutting peninsula of land above the yard of the B. & M. Railroad, and continues northwards over the main body of the Mystic River on what is known as the Chelsea North Bridge. The north bridgehead in Chelsea adjoins the grounds of the U. S. Naval Hospital. The entire structure is four lanes wide.

Both these low-level bridges have to be opened for practically every boat navigating the river or channel. A traffic count showed that the larger bridge

(*Continued on next page*)



C. & E. M. Photo

With pier M4 nearly done, the cofferdam for pier M3 is being cleaned out. Chelsea North Bridge will be removed when this new one just west of it is completed.

over the river is opened more than 7,000 times during the year. The count is lower on the bridge spanning the channel, for the channel is merely the entrance to a harbor with dock and wharf facilities.

When the new project is completed, the Chelsea North Bridge will be removed. The Chelsea South Bridge, however, will remain to provide access for local traffic to the Boston & Maine yards and docks. The new bridge is located just west of the old structure, and close enough so that the old bridge could be utilized for some of the construction operations, such as the placing of concrete in the river piers.

New Bridge

The new 11,700-foot high-level double-deck structure provides three lanes of traffic in each direction: the northbound traffic on the lower deck and the south-bound on the upper. The roadways are 36 feet wide between curbs. The major unit over the Mystic River is a three-span through-truss cantilever bridge 1,524 feet 2 inches long, consisting of an 800-foot 10-inch main span flanked on each side by anchor arms 361 feet 8 inches long. The main span is composed of a 387-foot 6-inch suspended span with a 206-foot 8-inch cantilever arm on each side. This long span forms a navigation opening to provide a vertical clearance of 135 feet above mean high water for a 700-foot width. The maximum height of the largest ship plying the river is 123 feet.

The Warren-type trusses, 60 to 115 feet deep, are on 45-foot centers; adjacent to the main piers the panels are subdivided. The floor system consists of a 7¼-inch concrete deck. Steel curbs, guardrails, emergency sidewalks, and handrails are provided. Sway frames and bracing are of conventional design. The structure is designed for H20-S16 loading according to AASHO standards of 1944.

Over the Little Mystic Channel the bridge is a single, simple double-deck through-truss span 439 feet 2 inches long, with a vertical clearance of 100 feet; the maximum height of the largest ship entering the channel is 97 feet. The structural features of this span, including the floor system, type of trusses, and bracing, are similar to those of the main cantilever unit.

Since space at the two ends of the bridge project is decidedly limited, the toll plaza was erected between the two over-water spans in the yard of the B. & M. Railroad. It is on an elevated steel structure whose top is 140 feet above the ground. The toll-plaza tower is wide enough to accommodate seven toll lanes on each level. The minimum vertical roadway clearance on each level, both at the plaza and throughout the bridge, is 16 feet. Just beneath the lower deck level in the toll tower is the administration building for the Bridge Authority. Access to the administration building and the toll booths is by an elevator which is framed into one end of the tower structure. The administration floor is 87 feet above the ground and has a ceiling height of 9 feet 8½ inches.

The approaches to the river and channel spans and to the toll tower consist of double-deck plate girders supported generally on steel bents. Where the new structure is over land, all the storm drainage from the deck is conducted into pipes and thence to sewers in the ground. The approach spans connect with existing surface streets in Charlestown and Chelsea. Their construction entailed the demolishing of many houses in this thickly settled neighborhood, and the moving of several others. Individual approach ramps to the bridge are 20 feet wide, curb to curb. The maximum grade, 3.6 per cent, is at the Charlestown end.

Fourteen Major Contracts

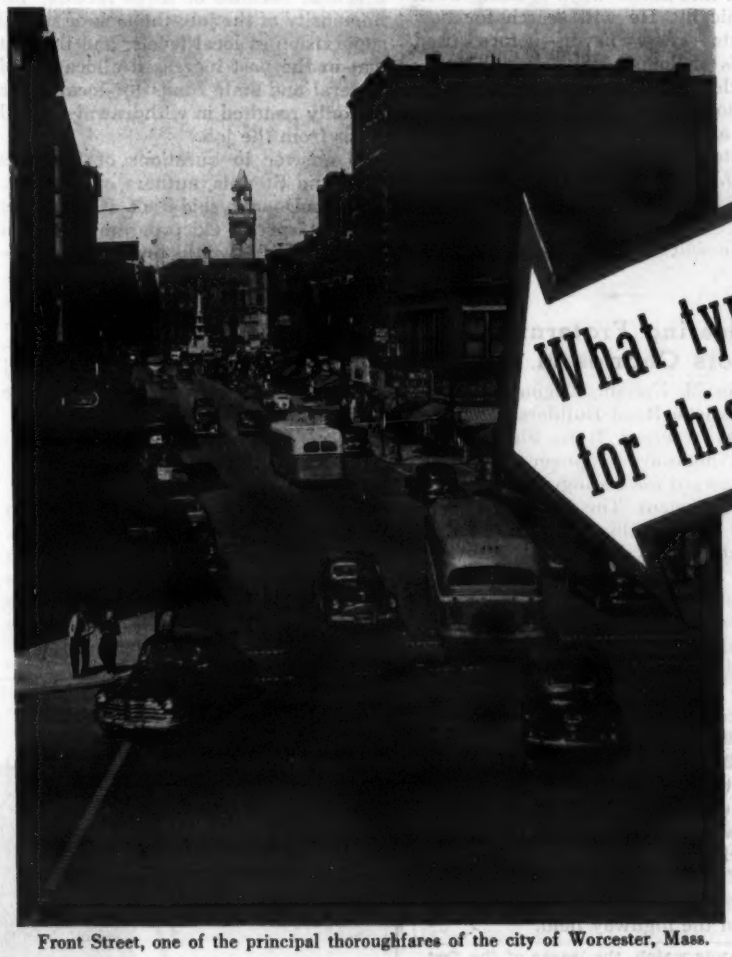
The design and engineering supervision of the construction of the bridge is handled by the J. E. Greiner Co. of Baltimore, Md., in association with Charles A. Maguire & Associates of Boston, Mass. The consulting engineering firms awarded fourteen major contracts on the project. The largest single item in the $27,000,000 cost of the structure is in the steel superstructure. Carbon steel used in the approach girders, for instance, had an average price totaling $225 a ton. This included a base price of $56 per ton, $48 a ton for fabrication, $87 a ton for erection, and $34 a ton for miscellaneous charges.

Construction got under way when Contract 2 was awarded to V. Barletta Co. of Roslindale, Mass., on a low bid of $269,900. This contract included the construction of two reinforced-concrete

(*Continued on page 75*)

C. & E. M. Photo

Left is the frame of the toll-plaza tower for the Mystic River Bridge. At the top will be the two roadway levels of the bridge, one under the other. The tower is wide enough for seven toll lines on each level.



What type of pavement for this kind of traffic?

The answer for this busy street was resilient, heavy-duty Texaco Asphaltic Concrete

Front Street, one of the principal thoroughfares of the city of Worcester, Mass.

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"Slave Gangs" on Construction Work?

It has been said that two wrongs never make a right. That saying never applied to any case with greater force than it does to "slave gangs" now reported to be forming on the payrolls of many contractors, particularly in the west.

With work on the wane and their savings accounts gone, many construction workers are willing through necessity to hire out to contractors for a weekly wage. In several of the cases reported, the weekly wage was equal to about 40 hours of work under existing AGC-AFL agreements. But the men are required to work on Saturdays, they frequently work several hours extra on weekdays, and they come in for odd shifts. That is why straight-time workmen have dubbed them the "slave-labor gang" on many jobs.

They do free work for contractors who are willing to chisel a few hours of each man's time.

We do not presume to know whether existing hourly wage agreements are justified, but we do believe that under-the-table wage chiseling can have nothing but bad effects on the contracting business as a whole. It puts ethical contractors in a bad spot to bid on projects. It cannot help creating unrest and dissatisfaction among the workmen who now feel forced to go along with the weekly wage. Finally, a contractor who chisels an hour of free time is just as guilty of stealing as the laborer who, just a few months ago, hid out for an hour on his job and failed to produce.

Inefficient, indifferent, unproductive labor was roundly—and justly—criticized through those years when personal productivity fell off so alarmingly. Now that the trends are being reversed, we do not believe that chiseling by management will make everything right. And nothing could be better calculated to drive personal productivity still farther down, at a time when it is desperately needed for the welfare of this nation.

The far-sighted contractor who really wishes to save on job costs will try first of all to find better ways of doing work mechanically. He will search for new shortcuts — new never - before - used methods of doing work. He will ruthlessly clear the deadwood from his organization. He will demand more imagination and better management from his superintendents. He may seek lower prices in materials, and lower prices in labor as the cost of living drops. But he won't chisel hours of a workman's time. He will do his cost-cutting honestly.

Engineering Fraternity Honors Charles M. Upham

Charles M. Upham, Engineer-Director, American Road Builders' Association, has received from Sigma Tau, national honorary engineering fraternity, its award for distinguished professional attainment. The award was announced by Upsilon Chapter of the organization at the University of Florida, which sponsored Mr. Upham. It was presented during the third annual Florida Highway Conference in Gainesville, Fla., last month.

Mr. Upham, who has been in the highway industry and profession virtually since graduation from Tufts College in 1908, has been head of the ARBA since 1926. He organized the Delaware and North Carolina highway engineering departments and did extensive consulting work in Latin America prior to his association with the American Road Builders' Association. He is also active on many boards and committees making studies in the highway field.

Rural-Road Aid Plan Opposed by the PRA

Special Federal aid for local rural roads, as proposed in two Senate bills, is impractical, according to Public Roads Administrator Thomas H. MacDonald. Mr. MacDonald made his views known at a hearing of the Roads Subcommittee of the Senate Public Works Committee. He also defended Federal standards for secondary roads as the product of experience and not of theory. He said his own answer to the first problem of local rural roads was "maintenance 365 days of the year" of existing roads. At another point he stated that "what we need most is an accounting of every road dollar" from all levels of government.

In support of his point of view, Mr. MacDonald said he considers the needs of the Interstate Highway System as outweighing, at least nationally, the proposed rural program. He cited a recent report on the system which showed a $10,000,000,000 deficiency in work to be done. Mr. MacDonald feels that Federal aid for local rural roads is impractical because of three factors: the immensity of the job; the lack of skilled supervision at local levels; and the fact that in the past increased allocation of Federal and state funds for local roads has only resulted in withdrawal of local funds from the job.

In answer to questions of Senators Kerr and Stennis, authors of the bills, Mr. MacDonald said that if Congress passes a special aid program for rural local roads, he would prefer to see allocations made directly to the states, with the states bearing the responsibility of the program. He suggested further subcommittee study of the rural-road problem, and said PRA would welcome a request from the committee to make such a study.

New FWA Administrator

General Philip B. Fleming has been nominated to the Maritime Commission. Since December, 1941, he has been Administrator of the Federal Works Agency, which includes the Public Roads Administration. Jess Larson is slated to succeed him in that post.

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Highway Drainage Report

A report on surface drainage of highways has been compiled in pamphlet form by the Highway Research Board of the National Research Council. The bulletin contains a progress report by the Committee on Surface Drainage of Highways, and three papers presented at the 27th annual meeting of the Board. These papers are entitled: "Description of Apparatus and Procedure for Testing Flow in Gutters and Storm Drain Inlets", by John C. Guillou; "Theory of Flow Through Short Tubes With Smooth and Corrugated Surfaces and With Square-Edged Entrances", by Garbis H. Keulegan; and "Experiments on Flow Through Inlet Gratings for Street Gutters", by Curtis L. Larson. The Committee report was prepared by the Committee Chairman, Carl F. Izzard, Senior Highway Engineer of the Public Roads Administration.

The pamphlet is 30 pages long and is complete with drawings, tables, and charts. In addition to telling the results of the various experiments, the papers also contain information on the equipment used and the test procedures followed. Copies of Research Report 6-B can be obtained by writing to the Board's offices at 2101 Constitution Ave., N. W., Washington 25, D. C. Cost of the report is 45 cents.

FIRST ALUMINUM BRIDGE IN WORLD OPENED

As crowds watch, the leaves of the first aluminum-alloy bascule bridge in the world are raised for the first time. The £85,000 bridge spans the junction between the Hudson and Kendon docks at the port of Sunderland, England. It weighs less than a freight engine, though each of its leaves is about 90 feet long. Four 25-hp electric motors can raise the leaves in 60 to 80 seconds.

British Combine Photos

Levee Builders Whip Pacific Seep-Water

Ocean and River Water Held by Earth Dikes as Machines Hurry to Build Flood-Protection Levee

By RAYMOND P. DAY,
Western Editor

WHITEY, the catskinner, was not a man to be afraid, but now he nervously licked his lips and goosed the bowl cable lever on the back of the D8. The tide was no longer ebbing. It had started to flow. As the big breakers crashed dangerously close to the big RU Carryall, little sandpipers ran farther and farther up the sandy beach, staying always a few inches ahead of the salt water.

Whitey didn't like this. Here he was, digging sand and cobblestone from the very mouth of the Pacific Ocean to make a protective dike on the seaward side of the big levee. If he was successful, the dike would hold back the surf while men and machines dug out the levee toe and filled it with derrick rock. But if he was unsuccessful . . . suppose an engine stalled and he lost the Cat . . . suppose something else should happen.

It did, and fast. The big 30-yard Carryall bowl dropped down too deep on a gouge, and Whitey jerked the lever on his power-control take-off to raise the cutting edge. With a crunch like a dull pistol shot the bowl cable parted, and the big Carryall settled in the sand, stalled.

Two big waves rolled in from Hawaii, boomed, and slithered halfway up the steel tracks on the D8, licking maliciously at the machine.

R. P. Brock, General Superintendent for A. Teichert & Son, Inc., happened to be near, and he sensed Whitey's plight immediately. Jumping in his Ford pickup, he raced for the yard. In a matter of minutes he had a spare control cable, Master Mechanic A. L. Hamm, and a helper. Back they went to Whitey's rescue.

They ripped out the rest of the cable already started by the agitated catskinner, and soon reeved the new one. But the water was coming up fast. By the time they had the cable secured, the big blades of the cooling fan were already splashing occasional sea water. Whitey jerked his throttle wide open, engaged his take-off clutch a little easier this time, and the scraper slowly came up. With the bowl in the clear, the big D8 wallowed triumphantly off up the beach in low gear, belching dark smoke from the engine stack.

Wet from head to foot, the mechanic's helper looked at Brock and Hamm. He grinned wryly and said, "I've changed cables on a Cat in a hell of a lot of places, but this is the first time I done the job in the middle of the Pacific Ocean!"

Brock, Hamm, and the anonymous skinner we named "Whitey" have been through a job that has been interesting, to say the least. Occasionally it has been more than that. For the Sacramento contracting firm of A. Teichert & Son, Inc., has built 14,070 linear feet of flood-protection levee along the left bank of the Ventura River to protect the city of Ventura, Calif., from wet-weather floods. The job extended from the ocean to Canada De San Joaquin, which is a smelly, oily little stream 2.66 miles from the sea, and which looks like anything but its high-sounding name.

Teichert's was awarded the contract on a low-bid offer of $984,640.50 by the Los Angeles District Office of the Corps of Engineers. The job consisted of excavation, embankment, quarry and derrick stone, grouted-stone blanket, the relocation of a pipe line, and the construction of miscellaneous structures. The biggest of these structures was a 100-cubic-yard affair to pass a branch train from Ventura to Ojai, Calif. If, in the future, floodwater gets up on the railroad tracks, aluminum stop logs can be inserted in slots in the front end of the structure to stop the water.

Work which began March 29, 1948, was scheduled for final completion December 27, and when the project was visited in October the work was ahead of schedule.

Design of New Levee

For 100 feet at the ocean end of the levee, the embankment was built 26 feet wide at the crest, with 2:1 side slopes. A quarry-stone blanket 6 feet thick, consisting of 6-ton maximum-size derrick rock, was then laid on both sides on a 2-foot layer of gravel filter-zone material. The top of the levee throughout was generally about 23 feet above the riverbed.

C. & E. M. Photo
Select material for the Ventura levee is loaded by a Lima 1201 dragline to a 20-yard custom-built truck which will haul it to the job site.

For the next 955 feet eastward, the embankment was built identically, but the derrick stone and filter-zone blanket

(Continued on next page)

Up to 50% More Mileage

yet you pay only 12½% more*

Super-stamina Goodyear Xtra Tred truck tires provide amazing mileage bonus—proved by actual performance records.

Here are the facts: Goodyear super-stamina Xtra Tred truck tires provide up to 50% MORE mileage, or better — for only 12½% increase in cost over standard tires.

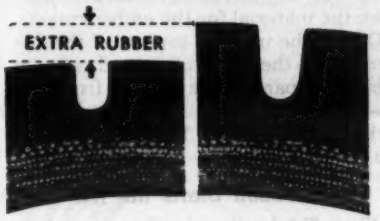
Here's the reason: The Xtra Tred has up to 50% greater depth of non-skid tread and skillful design concentrates this extra rubber so that there's 22% more wearing surface on the road—to further increase mileage.

Like other Hi-Milers by Goodyear, the Xtra Tred is available in either rayon cord or super-durable, heat-resistant nylon. If you have been unable to use extra tread tires in the past, we suggest that you try the nylon Xtra Tred.

Make your own test: Try at least one set of Goodyear Xtra Treds on one of your trucks — compare them point for point with any other tires over the roughest roads—in summer heat or winter cold. Give them the "works"—we believe the results will convince you.

Ask your Goodyear dealer now to recommend the right type of tires to increase your tire mileage—cut your tire cost-per-mile.

Extra Rubber Does It!



TREAD—*Cross-sections above are actual photographs of a regular heavy-duty tire (left) and the Xtra Tred (right), both in 10.00-20 size. Note that in non-skid tread alone, the Xtra Tred is as much as 50% deeper. Further, the Xtra Tred has 22% more wearing rubber on the road, because tread design is more compact. It all means extra miles.*

BODY—*To support that extra-thick tread, scientifically balanced compounds combine with super-strong cords to provide a body that is a standout for stamina, resistance to bruising, and ability to take recaps.*

BEADS—*So strong that bead failures are practically unknown. Husky broad-base, spiral-wrapped, dual-type—they keep tires solidly anchored—prevent slipping and tire damage.*

**Based on list prices in effect at time of printing*

Xtra Tred, Hi-Miler—T.M.'s The Goodyear Tire & Rubber Company

GOODYEAR
TRUCK TIRES

Teichert's men filch cobbles from the Pacific Ocean itself to build a sea wall for the Ventura levee. At left, a Caterpillar D8 helps a Caterpillar-drawn RU Carryall pick up a load of the material. The type of pilot cut shown above, made by a D8 and bulldozer, let toe-trench water drain off at low tide.

Levee Builders Whip Pacific Seep-Water

(*Continued from preceding page*)

was placed only on the front riverward side of the levee. The land side was simply graded down to a 2:1 slope.

For the next 2,736 feet, the embankment was built 18 feet wide, including 4.03 feet of stone facing. The back slope of this embankment was graded 2:1, while the front slope of the dirt and cobbles was graded 1.75:1. From 24 to 38 inches of quarry-stone facing in sizes up to 3 tons was then placed as protection. The variable width was achieved by placing the stone on a 2:1 slope. All stone up to this point was left open to fill with sand and dirt whenever floodwaters rose that high. Because the toes of the slopes extended far down underneath backfilled material, no elaborate toe protection was specified.

For the next 10,219 feet the embankment was built 18 feet wide on top, including 2.42 feet of stone. The back slope was cut 2:1, while the front slope was shaped 2.20:1. A grouted-stone blanket from 12 to 18 inches thick, made by laying the rock on a 2.25:1 slope, was then specified for protection. In all cases, the slopes were about 75 feet long from crest to toe, with the toe line well down under many feet of backfill. Thus in the future, when the Ventura River gets up as it did in 1938, 1893, and 1880, the levee will protect the city from danger.

The entire project was built along the left side of the channel to protect the city. Low hills covered with ranch land lie on the opposite shore of the normally dry stream. A low-water channel about 225 feet wide x 6 feet deep was dug in the streambed to produce the material for the embankments.

One of the unusual aspects of the design was the use of round stream cobbles, separated by grizzly from the pit-run material, for the grouted-rock facing on the upper 10,219 feet of the job.

Excavation Starts the Job

When Teichert's men first moved in to the job site, it was covered with mud, sand, willows, tules, and a few heavier trees and brush. Water lay close to the ground surface, and everyone knew that the toe trenches, when opened up, would have over 10 feet of water.

The initial excavation for the toe trench started at the ocean end of the job. A small ¾-yard P&H dragline, working from mats, excavated the trench and opened up the extensive excavation for the outer erosion protection where derrick stones would later be dumped. The machine worked only a few shifts and then it struck oil.

"Unfortunately, the stuff wasn't the kind of oil that makes a man rich," General Superintendent R. P. Brock explained. "It was the kind that makes a contractor poor."

Numerous oil wells, owned by several companies, are situated upstream from the job. Through the years, drill mud, sludge, and wastes from these wells have washed downstream in flood season and become pocketed in the riverbed.

The little P&H went to work loading out the black, objectionable material. About 10,000 cubic yards had to be dug out from under the levee location, trucked to a disposal area near the beach, and buried under plenty of sand. It was a smelly, tough job, one that everybody was glad to finish.

In the meantime, four LeTourneau 30-yard RU Carryalls had been brought in, with Caterpillar D8's as prime movers. Several D8's with bulldozers came down at the same time. The machines started to work building a short 500-foot section of dirt embankment at the upper end of the job—all except one scraper and a bulldozer. These machines were used at the ocean end to build a sand and cobblestone dike.

As the toe trench was opened up, it promptly filled with water. At low tide, however, the bulldozer cut a trench through the dike and the trench was permitted to drain for several hours. The dike was then plugged back to protect the trench while the sea was high.

(*Continued on next page*)

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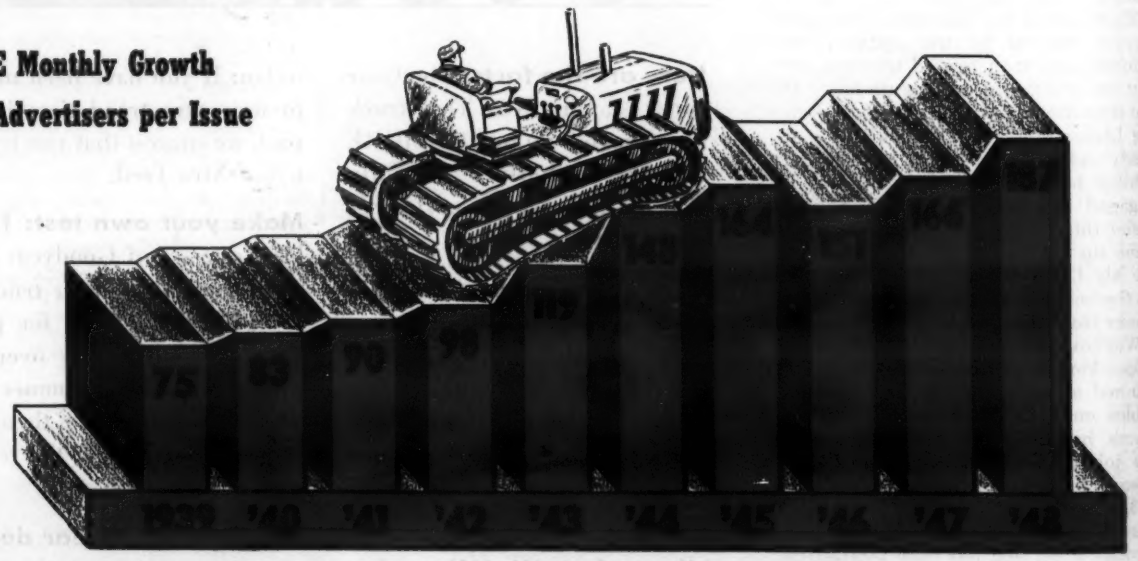

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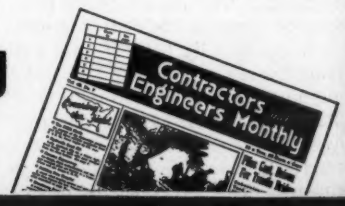

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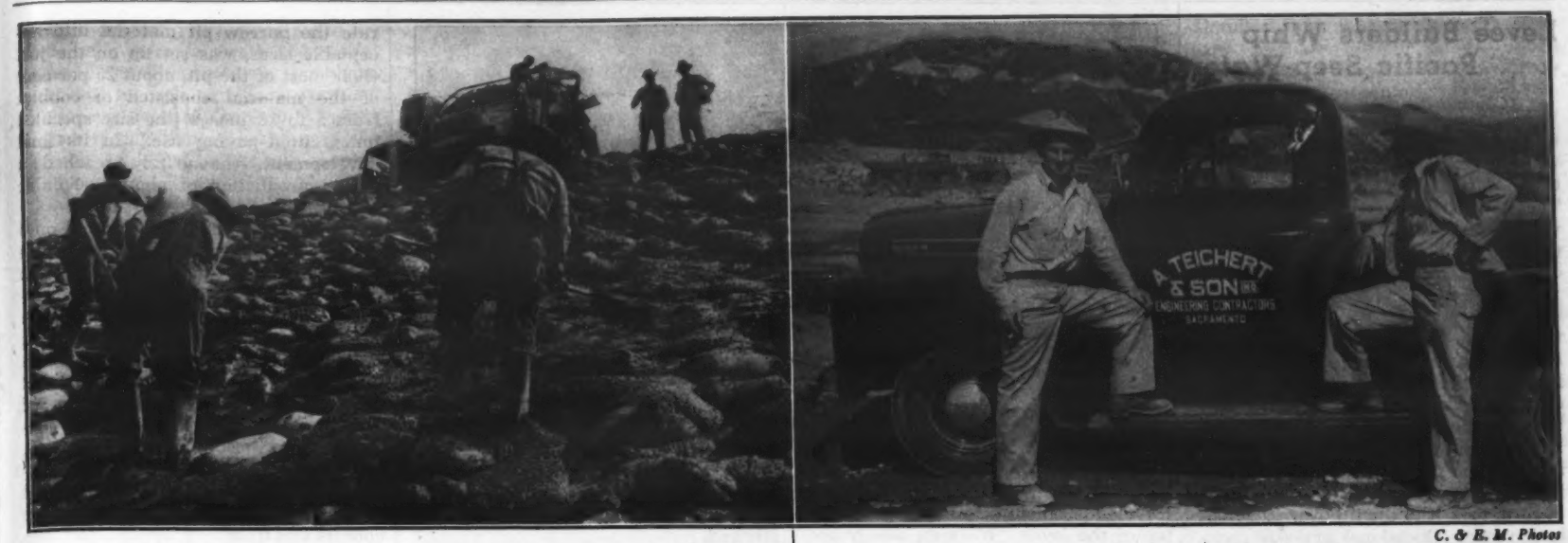

C. & E. M. Photos

A view of grouting work on Teichert's contract (first photo), and one of General Superintendent B. P. Brock (left in the second photo) in an informal conference with Assistant Resident Engineer Carl Yockers of the Corps of Engineers.

"Honest Adolph" Teichert, Jr., visited the job in the early stages, as he always does, and his tour of inspection took him out to the dike. Turning his back to the ocean to look at the layout of the work, Teichert mused, "I wonder if you didn't built the dike too high, Bob."

In reply, a big Pacific comber exploded on the beach, and water reached up to slap the Teichert company President in the back. Teichert, with a fine sense of humor, grinned and said, "I knew you didn't build it high enough!"

With the exception of the lower end of the job, where footing was bad, all the remainder of the toe trench was dug by a Lima 1201 dragline carrying a 3½-cubic-yard bucket. Any material which met the 12-inch-minus specifications for levee fill was cast over into the levee, where fill equipment could work it into the embankment. The major part, however, was tossed over beyond the levee toe in a stockpile, where it could be used later on for backfill over the levee toe.

At the upper end of the job, the right-of-way narrowed down to include practically nothing but the construction area. A 26-foot cut was made here to open the area up and expose the toe. This work was done by a Northwest 80-D dragline.

Levee Embankment Built

The few concrete structures which passed under the levee embankment were formed with wood shiplap lumber and poured by truck-mixers from the job batch plant. In almost all cases, the immediate construction area had to be dewatered by a big 6-inch Gorman-Rupp centrifugal pump before the concrete came in. Construction of these few structures proceeded without too much trouble, however, and that part of the work stayed out well ahead of the earth embankment.

Specifications for embankment material called for 12-inch maximum-size cobbles, graded down to dirt at the other end of the sieve scale. Since the streambed contained many a rock considerably bigger than 12 inches, some method had to be devised to separate the oversize material.

The ultimate answer to this problem, after some experimenting, consisted of three equipment spreads. First, there was the 4-unit fleet of tractors and Carryalls, which hauled the best sections of the borrow direct to the fill and spread it in 12-inch layers. Activities

(*Continued on next page*)

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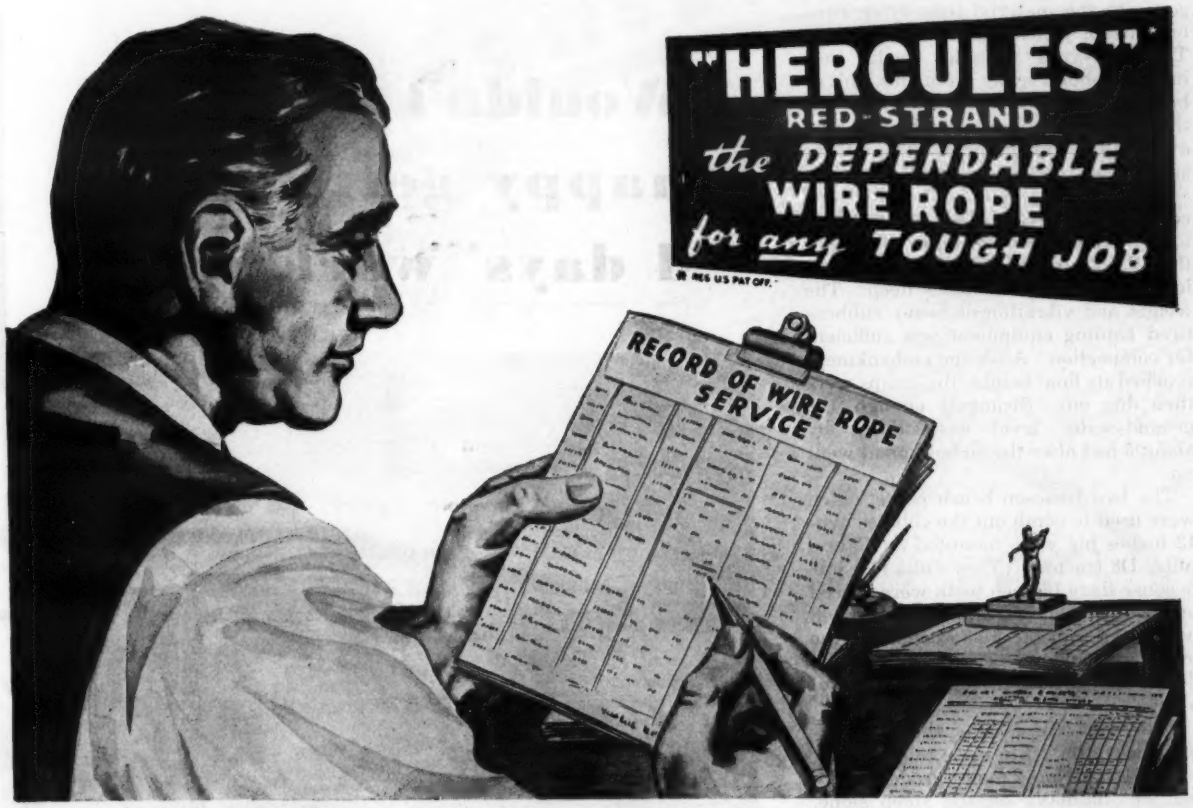

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Levee Builders Whip Pacific Seep-Water

(*Continued from preceding page*)

of this spread were augmented somewhat by cast material from the Lima dragline working along the toe trench. The occasional oversize stones which were brought in inadvertently by this outfit were then brushed and combed out by Isaacson brush rakes.

The second equipment spread consisted of four 20-yard custom-built trucks rented from Camillo Brothers of Los Angeles, which were loaded by the Lima 1201 dragline. This outfit, of course, was put to work only after the Lima finished the toe trench. The dragline was spotted in what looked like the best sections of the borrow pit where it loaded trucks with good material. They, in turn, took it to the fill over excellent haul roads. Occasional oversize rocks from this spread were also combed out by the brush rakes.

The third equipment spread consisted of a Marion 2½-yard dragline and a shop-assembled vibrating grizzly to separate the material into three sizes, one size of which was oversize rejects. Three 20-yard Camillo trucks then hauled cobbles away from this unit to be used in grouted-rock riprap, and three other Camillo trucks hauled fines away to the embankment. These three spreads, in brief, handled all the fill.

Access ramps were built of dirt and cobbles at intervals of about 1,000 feet, to allow equipment to enter and leave the fill. Embankment material went in in lifts not over 12 inches deep. The weight and vibration of heavy rubber-tired hauling equipment was sufficient for compaction. After the embankment reached its final height, the ramps were then dug out. Strangely enough, the ground-water level went down by about 5 feet after the embankment went up.

The two Isaacson brush rakes which were used to comb out the cobbles over 12 inches big were mounted on Caterpillar D8 tractors. They did a fine job, because their 18-inch teeth were spaced on 12-inch centers and they reached well down into the fill to comb out the oversize boulders. These were rolled down the backslope and disposed of later.

The riverward face of the embankment was dressed to close tolerance by a Caterpillar No. 12 motor grader working longitudinally on the steep slope. A four-part cable was hooked from the motor grader to a Hyster rear-end winch on the back of a D8, which traveled parallel to the motor grader on top of the levee. Working slowly and carefully, the two machines left the slope smooth and true, despite the cobbly character of the material. A tolerance of 2 inches in 50 feet was allowed.

C. & E. M. Photo

J. B. Stringfellow, who subcontracted derrick-rock work on the levee job, used this Northwest 80-D crane and Owen rock grapple to place the stuff.

Grizzly Separates Cobbles

A portable grizzly, designed to separate the borrow-pit material into acceptable sizes, was set up on the job. Over most of the pit, about 25 per cent of the material consisted of cobbles from 5 to 18 inches, the size specified for grouted-paving use. In its final development, the grizzly reached a steady production of about 100 cubic yards an hour.

The grizzly plant was mounted on a set of Athey Forged-Trak trailer treads and frame so it could be towed from place to place. It was all-electric-driven, with motors getting their power from a 50-kw diesel electric generating set powered by a Caterpillar engine. The grizzly plant consisted basically of a 9 x 14 x 6-foot steel hopper covered by tapered rails at 15-inch mean centers, a lower deck of 5-inch center rails, an Allis-Chalmers magnet-type vibrator which shook the entire hopper, and 30-inch conveyor-belt lines to remove cobbles and fines.

Because the usual type of steel rails so often used are brittle and break

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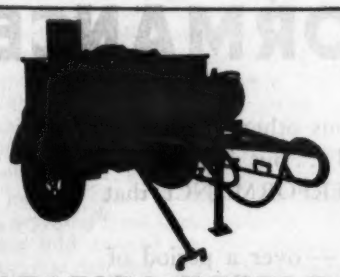

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Wouldn't YOU look happy getting out 4 days' work in 3?

Lowrie Paving Company, leading paving and underground contractors in the San Francisco area, have found that their Jaeger "new standard" Model 125 Compressors will each operate two 85# breakers at continuous peak performance, thereby breaking as much as 40% more pavement than they were able to do with previous model machines.

"We are doing as much work in 3 days with the new standard 125 as we did in 4 days with 105 ft. machines" says Jim Lowrie, who now has a fleet of 5 Jaegers in continuous operation.

You can get a comparable increase in production with any "new standard" Jaeger Air Plus. From the Model 75 that holds full 90 lbs. pressure in a heavy pavement breaker, up to the Model 600 that runs 2 heavy wagon drills at full 90 lbs., every Air Plus rating is matched to today's tools, not the tools used in 1932 when 60 to 500 ft. of air was enough. Ask your Jaeger distributor to prove this on your own job.

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easily under the heavy shock loads, the upper rails were fabricated of special malleable-steel structural members, reinforced by welding. They were set on a tapered center from 18 to 13 inches, in such a way that rock rolling down the deck would not be likely to hang up in a bind.

The outfit weighed about 40 tons, and the capacity of the Athey tracks was 6 tons. On the first move, the machine squatted down like a stubborn setting hen, the bottom of her tracks spreading out. But A. L. Hamm, the Master Mechanic, had a few tricks left up his sleeve. He lengthened the track shafts and installed extra outboard bearings to reinforce the frame. The rig gave no more trouble.

The grizzly machine received its rock supply direct from the 2½-yard bucket of a Marion dragline. Oversize rock rolled off, where it could be undercut and left. Fines passed through both rail decks and out one of the conveyor belts to a 20-yard truck, where the material was then hauled to the fill. Material passing the upper deck and retained on the lower deck passed out the opposite side of the rig to a 20-yard truck, and was then hauled off to make grouted paving.

"Flying Saucer" Spreads Rock

As the loads of cobbles left the grizzly, they went out to the levee, where half the loads were dumped at the levee toe and the remainder was dumped on top of the levee. Steel reinforcement rods were driven into the grade as a guide to thickness of rock by surveyors on the job.

The cobbles were then placed on the slope by a Northwest 80-D machine carrying a 2-yard clamshell bucket on its 60-foot boom. The cobbles were first placed from the toe of the slope upward, and then the top half was placed.

The cobbles which had been spread by clamshell, however, were uneven. To rid the slope of this unevenness, a special tool was built under the direction of Paul Shaw, Foreman, and Johnny Hunt, operator of the Northwest. It was called the "Flying Saucer".

The rig is simply a 15 x 15-foot square steel pad, made up of box girders from a junk Bailey bridge, and reinforced by the addition of heavy sections of kelly-bar shaft steel from the nearby oil fields. It could be picked up by chain bridles on the load line of the Northwest, and controlled further by the drag cable. It weighs about 5½ tons.

Hunt developed a remarkable facility for skimming the thing along to level off the humps, and then, when the cobbles were level, he pancaked the "Flying Saucer" down on the slope to pat the stones down to firm bearing—a remarkable job by an incongruous tool.

Four truck-mixers then operated from the top of the slope to apply the portland-cement grout. Two of these machines were Jaeger Hi-Dumps, two were Rex Moto-Mixers. The grout flowed down the slope, aided by the stiff brooms of a 5-man labor gang, and penetrated the interstices between the stones. Test holes were dug at random later, with moil points, and they proved that all the voids were full of cement grout to the subgrade.

Many of the round rock tops were left sticking up above the level of the grout to take erosion punishment later on, but plenty of grout was put in to imbed each stone. Specifications placed a limit on the amount of grout allowed, and this was checked closely as the work progressed, with minimum cement over-run.

The grout mix consisted of 7.73 sacks of cement per cubic yard, with a water-cement ratio of 8½ gallons per sack. Sand was shipped in from the Irwindale plant of Consolidated Rock Products Co. in Los Angeles County, and bulk cement was trucked in from the Monolith plant at Tehachapi, Calif. This cement was shipped in large cans, carried on a flat-bed trailer and truck. It was unloaded at the Blaw-Knox central batching plant in the center of the job by a monorail electric hoist, and dumped to a round hopper whose outside perimeter was congruent with that of the cans. A screw conveyor then carried the bulk cement up to the 1,100-barrel-capacity Blaw-Knox cement silo. The cement arrangement was also set up so that bulk trailer carriers could dump in a ground-level hopper.

On average days, seven 57-ton sand cars were unloaded at the plant by the ¾-yard P&H machine which had started the original excavations. Its clamshell also kept the 250-ton sand bins supplied. About 600 barrels of cement per day was also used. Each day about 300 cubic yards of grout went out to the job—enough to cover about 200 linear feet of bank. On the peak day, 559 cubic yards of grout was placed. Mixing water was added at the batch plant. It came from the Ventura city mains.

Stringfellow Places Derrick Rock

All the 3 and 6-ton maximum-size derrick rock at the lower end of the job was quarried and placed under a subcontract with J. B. Stringfellow of Riverside, Calif. Much of the extensive rock and jetty work from Imperial Dam to the Pacific Ocean in southern California has been placed by J. B. Stringfellow, who is a specialist in that type of work. His men and equipment under C. F. Pennington attacked this job with their usual vigor.

Two quarries were developed, one 16½ miles from the job and the other 31 miles. The long hauls were necessary because durable stone which would meet the specifications was scarce. These quarries produced a bluish-gray sandstone, but in many cases about 60 per cent of the quarry output had to be wasted.

Equipment in the first quarry consisted of a Northwest 80-D shovel, a 365-cfm Gardner-Denver compressor, and a Gardner-Denver wagon drill. Hauling equipment consisted of ten rented 12-ton trucks of various makes. At the second quarry 31 miles distant there was a Northwest 25 shovel, a 210-cfm compressor, and a wagon drill. Six trucks hauled from this quarry, with a permissible load limit of 16 tons.

The trucks dumped the material at the toe of the slope, where a Northwest 80-D crane and an Owen 4-prong rock

(*Concluded on next page*)

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(*Continued from preceding page*)

grapple placed the heavy rock halfway up the slope. At this point the earth backfill was pushed in; the machine could then place the rest of the slope in the same manner, since backfill covered about half the slope.

Friendly rivalry and ribald kidding between "Penny" Pennington and Superintendent Brock culminated one night in a flat declaration on Penny's part that the only way to make money on the job was a $20 bet on a bowling game. What happened is not exactly national news, but Brock convinced the rock man that he would make more profits by sticking to his rock pile.

The entire job, in fact, was outstanding in its spirit of friendliness and cooperation between Teichert's men, subcontractors, the Corps of Engineers, and Ventura County. Ventura County had provided the right-of-right, and many details arose to plague the construction forces. Without any exception, everyone on the job praised the intelligent cooperative spirit of Ventura County Engineer Bob Ryan, who worked many a long hour overtime to do the County's part.

The job, too, was extremely hard on equipment. The big boulders cracked final-drive cases and delivered shocks so severe that internal parts were sometimes sheared in two. But Hamm kept them all repaired, and he and Brock even found time for relaxation. Like the time when the old grease-wagon driver won a turkey on a raffle. Pop thought it was a beautiful bird. Nobody would deny that. Exactly how it would look, and what Pop's reaction would be when the shop boys painted the big bronze bird a Caterpillar yellow was something else again. The trick was under serious consideration when the job was visited.

Personnel

For the Army, the job was directed by Colonel A. T. W. Moore, District Engineer; W. J. Leen, Operations Officer; J. H. Heinmiller, Resident Engineer; and Carl Yockers, Assistant Resident Engineer and Chief Inspector. Harry Mahoney was Office Engineer. Charles Hunt was Chief Clerk, and Jack Bartlett and Wiley Jolly were on the inspection force.

R. P. Brock supervised most of the job for Teichert as General Superintendent, with L. F. de Stowlinski as his assistant. A. L. Hamm was Master Mechanic, and Foremen were Paul Shaw, William Masters, Frank Roberts, and Herman Schuth. C. F. Pennington directed Stringfellow's subcontract.

Working two 9-hour shifts per day, this friendly gang jammed an important job to its end ahead of schedule; a job which will get all hands a silent vote of thanks from Ventura's citizens the next time the river goes wild.

All-Position Mower

A new mower designed to operate in any position from vertical to vertical, regardless of terrain, has been announced by the Ariens Co., Brillion, Wis. This Ariens all-purpose all-position precision mower attaches to an Ariens tiller which provides the power for cutting anything from lawns to large tough grass and weeds, the manufacturer states. It will cut to 1 inch, 1¾, or 2½ inches by simple adjustment.

The new Ariens precision mower is designed to operate in any position from vertical to vertical, regardless of terrain.

The cutting bar is 42 inches wide. By reversing the mower hinge assembly to the left, the cutting width may be reduced to 28 inches from the right wheel for fence-row and other narrow mowing. Equipped with forged-steel guards with integral ledger plates, the cutting bar is made of of 2-inch sections; there are no plates to change. Blade travel is synchronized with the forged-steel guards when the unit is manufactured, and this synchronization is automatically maintained in all positions, the company reports.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 67.

Vibratory Screens

Vibrating screens in new models are available from the Syntron Co., 227 Lexington, Homer City, Pa. They consist of stepped, punched plates with tapered elongated openings, in single or multiple-deck styles. The screen area is activated by a Syntron Vibra-Flow vibrating motor, featuring variable control of material flow.

The new line of screens is said to provide a two-purpose piece of equipment —a vibrating screen and a rheostat-controlled vibratory feed. Syntron recommends it for increasing the efficiency and capacity of crushers, and to prevent damage to belt conveyors by allowing fines to cushion the lumps.

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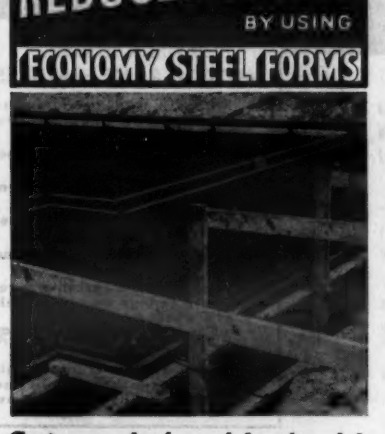

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Pre-War Grading Job Paved With Concrete

Alternate U. S. 50 in W. Va. Is Improved for 5.5 Miles With 8-Inch Reinforced Slabs, 22 Feet Wide

✦ LAST summer a reinforced-concrete pavement was laid on a 5½-mile stretch of Alternate U. S. 50 in West Virginia between Maxwell and Pike, a piece of highway that had been graded before the war. Shortage of essential materials had delayed for several years the resumption of work on this Federal route which is known locally as the Ridge Road. Located partly in Pleasants and partly in Ritchie County, the improved section now has a 22-foot pavement of 8-inch uniform thickness. Alternate U. S. 50 is north and roughly parallel to U. S. 50, and crosses from Ohio into West Virginia at St. Marys on the left bank of the Ohio River. From there it continues in a southeasterly direction until it joins U. S. 50 at Pike.

The State Road Commission of West Virginia awarded the concrete-paving contract on a low bid of $384,630.18. The job got under way on May 24, 1948, and although rain and material shortages delayed construction, the pavement was completed by September. The average rate of progress was 1,500 linear feet of 11-foot single-lane pavement in a 9-hour working day. Work started at the lower or Pike end of the job on the north-bound lane and proceeded northerly in the direction of St. Marys where the batch plant was located. When the first half of the road was finished, the south-bound lane was paved, also in a south-to-north direction.

This section was graded before the war to a 32-foot roadway, allowing for a 22-foot pavement and flanking 5-foot shoulders. In 1947 a 1¾-mile concrete-paving contract south from St. Marys on Alt. U. S. 50 was finished. The 4.86 remaining miles which lie between these two new stretches of concrete will be similarly paved. When they are, the full 12-mile length of the Ridge Road will have a 22-foot concrete pavement with a good alignment and easy gradient, minus many of the sharp curves that characterized the old black-top road.

Concrete Batch Plant

A concrete batch plant was set up in St. Marys with a 10-mile average haul to the job. The plant actually was divided into two units ½ mile apart. A Blaw-Knox 300-barrel cement bin was erected by a siding of the Baltimore & Ohio Railroad for the storage of bulk cement. Two makes of air-entraining portland cement were used—Columbia, shipped from Zanesville, Ohio, and Alpha, out of Manheim, W. Va. Both came by rail and were unloaded into the bin with a screw conveyor and enclosed elevator.

The aggregate, two grades of gravel and one of sand, was supplied by the Ohio River Sand & Gravel Co. It was dredged from the river and delivered by barge to a point on the bank near the bridge spanning the Ohio. Conveyors moved the material up the bank to a clearing where three stockpiles were created. A Link-Belt Speeder crane with a 50-foot boom and a Blaw-Knox ⅞-yard clamshell bucket loaded the fine and coarse aggregate into a Blaw-Knox 105-ton 3-compartment storage bin. Batch trucks, up to 15 in number, first backed under the aggregate bin for their loads of sand and gravel, then drove on to the cement bin. The trucks held 3 batches of 1⅓ cubic yards per batch. The contractor owned 7 of the trucks, while the others were hired on a batch-mile haul basis.

The Mix

The weights of a typical 8-bag batch

(*Continued on next page*)

C. & E. M. Photo

Concrete is dumped from the 35-foot boom and bucket of a Ransome 34-E dual-drum paver on the West Virginia paving job. A Jaeger screw-type spreader follows the paver.

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Simple in construction, and easy to use, *ESCO* hinge repair links are made of manganese steel, with a high alloy steel pin. They are flexible in use, with strength enough for severe service.

ESCO catalog 108H contains sizes, dimensions, and other detailed information on these accessories. Get your copy from your nearest *ESCO* office or use the coupon. Electric Steel Foundry, 2169 N.W. 25th Ave., Portland 10, Oregon; 720 Porter St., Danville, Illinois. Offices in Pottsville, Pa.; Eugene, Oregon; Chicago; Honolulu; Houston; Los Angeles; New York; San Francisco; Seattle; Spokane. In Canada, *ESCO* Limited, Vancouver, B.C.

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Pre-War Grading Job Paved With Concrete

(Continued from preceding page)

were as follows:

Cement	752 lbs.
Sand	1,432 lbs.
No. 2 gravel	1,348 lbs.
No. 6 gravel	1,348 lbs.
Water (28 to 31 gals.)-average	234 lbs.
Total	5,114 lbs.

From 3 to 4 per cent of air was obtained in the mix with the use of the air-entraining cement, and the slump averaged between 2 and 3 inches. The gradation of the aggregate follows:

Sieve Size	Per Cent Passing		
	No. 2 gravel	No. 6 gravel	Sand
2½-inch	100	...	...
2-inch	90-100	...	...
1½-inch	35-70	100	...
1-inch	0-15	90-100	...
½-inch	0-5	25-60	...
⅜-inch	...	...	100
No. 4	...	0-10	95-100
No. 8	...	0-5	80-95
No. 16	...	...	50-85
No. 50	...	...	5-25
No. 100	...	...	0

Preparing the Grade

In the grading contract a 6-inch layer of gravel had been spread over the subgrade, which was mostly clay. The surface was reshaped in this contract by a pair of Adams motor graders before the Heltzel forms were set by hand for an 11-foot lane. A total of 4,500 linear feet of forms were on the job, and at least 500 feet of forms were always kept in shape ahead of the paver.

Excess material between the forms was then thrown off to the side by a Buckeye mechanical subgrader. It was followed by a Hercules 10-ton 3-wheel roller which served a double purpose—first to compact the base, and second to pull along over the forms a Heltzel planer which cut out the precise 8-inch-deep cross section. In front of the paver came a Galion 8 to 10-ton tandem roller for a final smoothing of the base.

The forms were oiled and the grade wet down. Gaps were left in the forms for the batch trucks to enter, for the paver worked in between the forms since traffic was maintained over the other half of the road during all of the construction. Naturally the joints were set after the paver had passed the points where they were to go. The expansion joints were placed 589 feet apart, and the contraction joints every 31 feet. Both types of joints had similar assemblies and dowels. The dowels were ¾ x 18-inch, eleven in number, and equally spaced across the 11-foot lane. At the expansion joints the dowels passed through a ¾-inch thickness of cork 11 feet long and 7½ inches high. This left the top of the expansion material ½ inch below the surface of the concrete. A metal cap filled the open slot.

To tie and bond the two lanes together along the center longitudinal joint, a wooden keyway was bolted to the inside form of the first lane. Also, after the paver had passed, hook bolts were inserted into the concrete through holes in the sides of the forms on 5-foot centers. The bolts were ½ x 15-inch, and had half their length in one lane and half in the other. Before the concrete was placed, the grade was given a last check with a scratch template pushed along in front of the paver.

Concrete Paving and Finishing

The batch trucks backed in between the forms to dump their contents into the skip of a Ransome 34-E dual-drum paver. Water was supplied to the paver from two 1,000-gallon tank trucks which were filled from a creek at the south end of the project by a Rex 3-inch centrifugal pump. One truck at a time kept the paver supplied through a 2-inch hose from a position outside the forms, while the other truck went to be refilled. To the regular 200-gallon tank on the paver, an auxiliary 800-gallon tank was added, giving the paver a total water storage capacity of 1,000 gallons. This prevented any hold-ups in the paving operations due to lack of water, for the supply trucks often had to be shifted about to let traffic pass on the open half of the road.

The paver drums revolved at 19 rpm and batches were mixed a minute in each. They were then discharged between the forms from the 35-foot boom and bucket of the paver. The concrete was leveled off 3 inches below the top of the forms by a Jaeger screw-type spreader, which then backed up for the placing of the steel-mat reinforcement. More concrete was added, and the spreader made another pass, this time striking off the concrete level with the top of the forms. Behind the spreader came a Heltzel Flex-Plane dual-screed finishing machine. Before it made a pass, the concrete was vibrated along the forms by a Jackson vibrator carried on the front end of the finisher.

Following the spreader was a 4-wheel bridge with a span great enough to accommodate a longitudinal bullfloat which was handled by two finishers

C. & E. M. Photo
At the batch plant set up for the Alternate U. S. 50 job, a Link-Belt Speeder crane loads sand into a Blaw-Knox 105-ton 3-compartment aggregate bin.

crossing on boards laid across the bridge at both ends. The float was a 10-foot length of a 2 x 6, with a vertical stiffener down the center and plow handles at the ends. Usually one pass with the bullfloat was sufficient. From the rear of this bridge, steel strips were embedded in the surface of the concrete along the transverse contraction joints. The results of the paving and finishing operations were carefully checked with a 10-foot aluminum straight-edge, and surface laitance was removed by pulling a belt lengthwise over the fresh concrete. The belt was a 3-foot strip of burlap, 12 feet wide, handled by a man on each side.

Curing

The joints were then edged with a ¼-inch-radius tool, and a second strip of burlap was pulled over the surface of the concrete as a final finishing touch. As the concrete set up slightly, the steel strips were removed from the contraction joints. The caps were also taken off the expansion joists, and a ¾-inch strip of wood, 3 inches deep, was placed in the slot to prevent it from filling up until after the concrete had fully hardened. The joints were later poured

(Concluded on next page)

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presents MILTON BERLE
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See newspaper for time
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C. & E. M. Photos

Concrete on the West Virginia paving project is vibrated along the forms by a Jackson vibrator carried on the front of a Heltzel Flex-Plane finishing machine (left). Then workmen pass a longitudinal bullfloat over the surface (above).

with asphalt.

As soon as the concrete had attained its initial set, the surface was covered with burlap to prevent it from drying out too quickly. In warm weather the burlap was wet down with water pumped from a 350-gallon tank carried on a flat-bed truck. The water was sprayed over the surface through a 1-inch hose line under pressure from a Rex 2-inch pump carried on the truck.

Next morning the burlap was removed from the concrete, and the surface was then wet down with a 3-to-1-strength solution of sodium silicate. This curing agent was swept over the concrete with hand brooms which were dipped in drums of the solution pulled along in a trailer.

As the pavement was completed, the shoulders were built up to their full 5-foot width with gravel dug from a borrow pit by a Marion ¾-yard shovel. Trucks hauled the material to the road where it was spread over the shoulders by a Caterpillar D6 dozer. Where necessary, guardrail of concrete posts with steel mesh in between was erected.

Quantities and Personnel

The major items included in the paving contract were as follows:

Unclassified excavation	5,000 cu. yds.
Borrow	10,000 cu. yds.
Gravel for shoulders	6,000 tons
Reinforced-concrete pavement	72,500 sq. yds.
Pavement reinforcing	290,000 lbs.

A force averaging 60 men was employed on the project. Clyde H. "Spider" Webb was Project Engineer for the State Road Commission of West Virginia, and W. B. Rittenhouse was Concrete Technician. The Commission is headed by Ray Cavendish, with M. L. O'Neale, Chief Engineer. George W. McAlpin is State Construction Engineer.

Geophysical Surveys

Equipment for geophysical and subsurface explorations is manufactured by the Century Geophysical Corp., Tulsa, Okla. It includes portable refraction seismographs, recording galvanometers, cable fault-finders, recording oscillographs, water-type seismometers, surveyors' equipment, shooting equipment, and heavy-duty drills.

This equipment is designed both for preliminary surveys and for permanent information. It can be used to determine depth of water table or bedrock in connection with all types of construction work. And in addition to the equipment it manufactures, Century also provides complete research facilities, accurate interpretation techniques, and personnel with a wide range of experience in all types of exploration work.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 92.

LeTourneau Ups Vincent

James A. Vincent is named District Sales Representative by R. G. LeTourneau, Inc. He will cover the states of Georgia, Alabama, Florida, and Tennessee, from his headquarters in Atlanta. LeTourneau distributors in this territory include Dempster Bros., Inc., Florida Equipment Co., Gill Equipment Co., and Miller G. Williams Machinery Co.

Mr. Vincent succeeds Ken Ross, who has accepted a position with the Gibson-Stewart Co., construction-equipment distributor in Cleveland, Ohio.

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Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

New Paving Breaker Has 38-Pound Weight

A 38-pound paving breaker is announced by the Gardner-Denver Co., 102 Williamson St., Quincy, Ill. Among the features claimed for the B37 are a renewable chuck liner, a block-type pistol-type hammer, and a tappet designed to minimize wear on the hammer striking face. The tappet operates in a renewable bushing.

The B37 is equipped with a throttle valve lock said to act as a safety device to cut down on accidents. The manufacturer states that the B37 has a fast cutting action without violent recoil, an exhaust that will not freeze, a low-lift plate valve to assure low air consumption, and a long piston stroke to provide hard-hitting blows. Additional features include a quick-acting latch-type steel retainer which holds the tool securely, and an integral oil reservoir which meters oil to every working part.

Further information on this new piece of equipment may be secured from the company. Or use the Request Card at page 16. Circle No. 24.

The new Gardner-Denver B37 paving breaker is designed for fast demolition work wherever footing is treacherous.

New Film on Grading

A new 20-minute full-color movie entitled "Better Blading", which covers the manufacture and uses of Caterpillar diesel Nos. 12, 112, and 212 motor graders, has recently been completed by the Caterpillar Tractor Co., Peoria 8, Ill.

The film portrays the design and engineering features of these three sizes of graders, using photography techniques new to industrial film production, Caterpillar reports. A portion of the film is devoted to grader operations; it also goes into the actual manufacture and assembly of the graders at the Peoria plant, and highlights the materials and processes used in grader production.

Copies of the film have been sent out to Caterpillar distributors throughout the United States, Canada, and the export market. Those interested in seeing this film, or in securing copies to show at meetings, should get in touch with the nearest Caterpillar dealer, the company at Peoria, or this magazine.

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The Owatonna service kit No. AT-23 was designed especially for use with Autocar trucks, though it can be used on other makes.

Set of Service Tools

A set of service tools for use with Autocar trucks as well as other makes is announced by the Owatonna Tool Co., 348 Cedar St., Owatonna, Minn. This set includes tools for removing and installing tight-fitting parts such as bearings, outer bearing races, bushings, gears, shafts, etc. According to the manufacturer, the basic pulling tools in kit No. AT-23 are adjustable to cover a wide range of sizes.

Further information may be secured from the company, or by using the Request Card at page 16. Circle No. 74.

Water Tank for Paver

A new water tank for use with the Duomix dual-drum 34-E MultiFoote concrete paver is announced by the Foote Co. of Nunda, N. Y., a subsidiary of the Blaw-Knox Co. This tank is mounted on the side of the machine, opposite the operator's platform, with the other equipment making up the main water system.

The company reports that the tank will carry 650 gallons of water over and above the normal water supply of 210 gallons, and will provide plenty of capacity between tank wagon trips to avoid shutting down. Equipment includes a pump for handling water from wagon to tank.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 46.

Concrete Coloring

Among the colors for concrete, mortar, and terrazzo available from Reardon Industries, 2837 Stanton Ave., Cincinnati 6, Ohio, is a brilliant red for use in concrete. It can be used to designate portions of pavement intended for special uses, such as decelerating lanes and truck lanes. It can also be used to identify sections of concrete pipe or of mass concrete, as in dams, etc.

The color is added by mixing one small bag of the coloring material to one bag of cement; or, in the case of pavements, it may be floated on the surface of the freshly laid concrete.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 49.

Front-End Loading Unit

A front-end loading unit for mounting on trucks or tractors is discussed in literature prepared by Marion Machine Co., Inc., Marion, N. C. One bulletin describes the action of the Marmach loader when truck-mounted; another deals with its use on J. I. Case tractors; and a third with its use on International Harvester I-6 and ID-6 tractors.

The various features claimed for the Marmach loaders are treated thoroughly. These include the double hydraulic action provided by two hydraulic cylinders; the arm-and-shoulder action of the lifting arms; low center of gravity; steam-shovel type of crowding action; rigid bucket; positive lowering action; simplicity of operations; and others. The bulletins also stress the loading cycle, showing how the load is picked up, lifted over the truck or tractor, and dumped at the desired location.

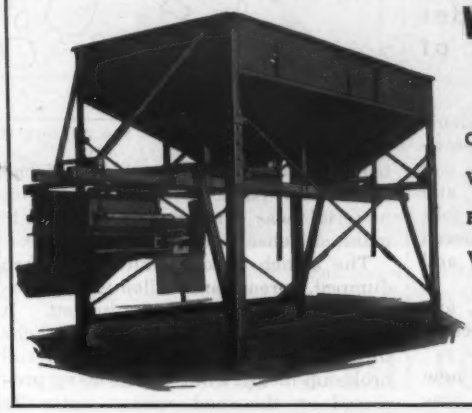
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 62.

Data on Portable Hoists

Portable hoists in four sizes are described in a catalog prepared by the King Mfg. Corp., 3146 W. Chicago Ave., Chicago 22, Ill. They include the 2-hp Model 250, the 4-hp Model 340, the 6-hp Model 360, and the 6-hp Model 450. These hoists range in capacity from 200 to 1,000 pounds, with line speeds rated at 300 fpm. They are mounted on a wheel-barrow-type chassis to make it easy to transport them from place to place.

The catalog contains complete details on the control, bearings, and governors used on the King hoists. Specifications cover capacity, power unit, dimensions, amount of cable the units will handle, and weight. This information is provided for all four models. The catalog also contains a set of instructions for operating the King hoists, and a repair-parts list accompanied by an indexed photograph showing the location of these parts.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 28.



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Seal Coat Stops Bad Mud Pumping

3-Inch Caliche Cover Over Clay and Boulder Fill Keeps Mud Out of Cinder Sub-Base

+ ROAD building in the general vicinity of Ashfork, Ariz., has been a problem as long as highway engineers can remember. Black clay, gumbo, and Malapai boulders slowed down the jobs under construction. Black mud oozed up under the pumping of traffic, and ruined the jobs that were finished.

That situation is now whipped, apparently for good, by a clever piece of design and field work.

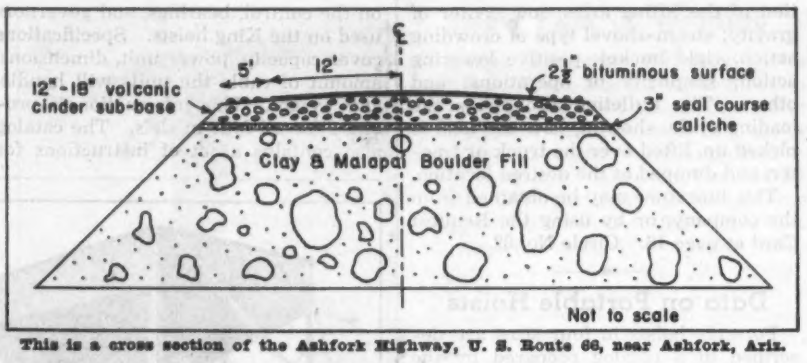
About three years ago, when a new 9-mile section of construction was under consideration, engineers were trying desperately to solve the situation. In the past, they had built transcontinental U. S. 66 as strong as they then thought possible, using up to 18 inches of volcanic-cinder sub-base under the pavement. But rain and snow which fell in the winter months saturated the clay subgrade. The mud came up through the cinders in a matter of about two years; the pavement then began to wave and break up.

J. A. Parker, District Engineer for the Arizona State Highway Department, started the ultimate line of thought when he casually asked, "Why don't we seal off that mud with asphalt, at the time we finish the subgrade fill?"

There were several native pits of caliche in the vicinity, however. Caliche is a grayish-brown lime formation, reasonably hard and durable wherever it is found in the southwest. It was decided to use a 3-inch seal cover coat of this caliche over the subgrade, to prevent the mud from coming up in winter, and the plans and specifications were prepared in accordance with that decision.

The Job

Contractor W. H. Hensen of Prescott got the job. Conventional earth-moving methods were used to build the subgrade. During the normally dry construction months, the black clay and



This is a cross section of the Ashfork Highway, U. S. Route 66, near Ashfork, Ariz.

boulders handled reasonably well and caused no particular problem. This material was shaped and graded to make as dense a roadbed as possible.

The 3-inch caliche course was then dumped, spread, and rolled with pneumatic and sheepsfoot equipment. It was not necessary to pass the caliche through a crusher, because the material broke up nicely while it was being processed on the road, with a naturally good proportion of fines and coarse particles.

From 12 to 18 inches of volcanic cinders, also available in near-by pits, was then laid down to form the subbase for the pavement. This material was laid in three lifts, watered, and pneumatic-tire-rolled. Some smooth-steel-wheel rolling was also done.

A 2½-inch road-mixed pavement, made with crushed aggregate and MC-3 asphalt, was then laid down for the 2-lane roadway. This pavement in turn was sealed and given a light armor coat of cover chips.

The Results

That was two years ago, and the results have been very interesting indeed to all the engineers who have watched the behavior of the 9-mile section.

For now, when theoretically the road should show the first signs of ultimate failure, no signs are there. A few test holes sunk down into the cinder bed show that the cinders are still dense, but as free and clean as before. The caliche cover has not been deflected or pumped. Rain and snow penetrate the cinder bed, but run out when the weather clears. Weather cold enough to cause frost heaves often occurs, but the cinder blanket, free of mud, acts instead as an insulating course.

Looking at the early record of this piece of road, it appears indeed as if a very troublesome problem has been successfully whipped.

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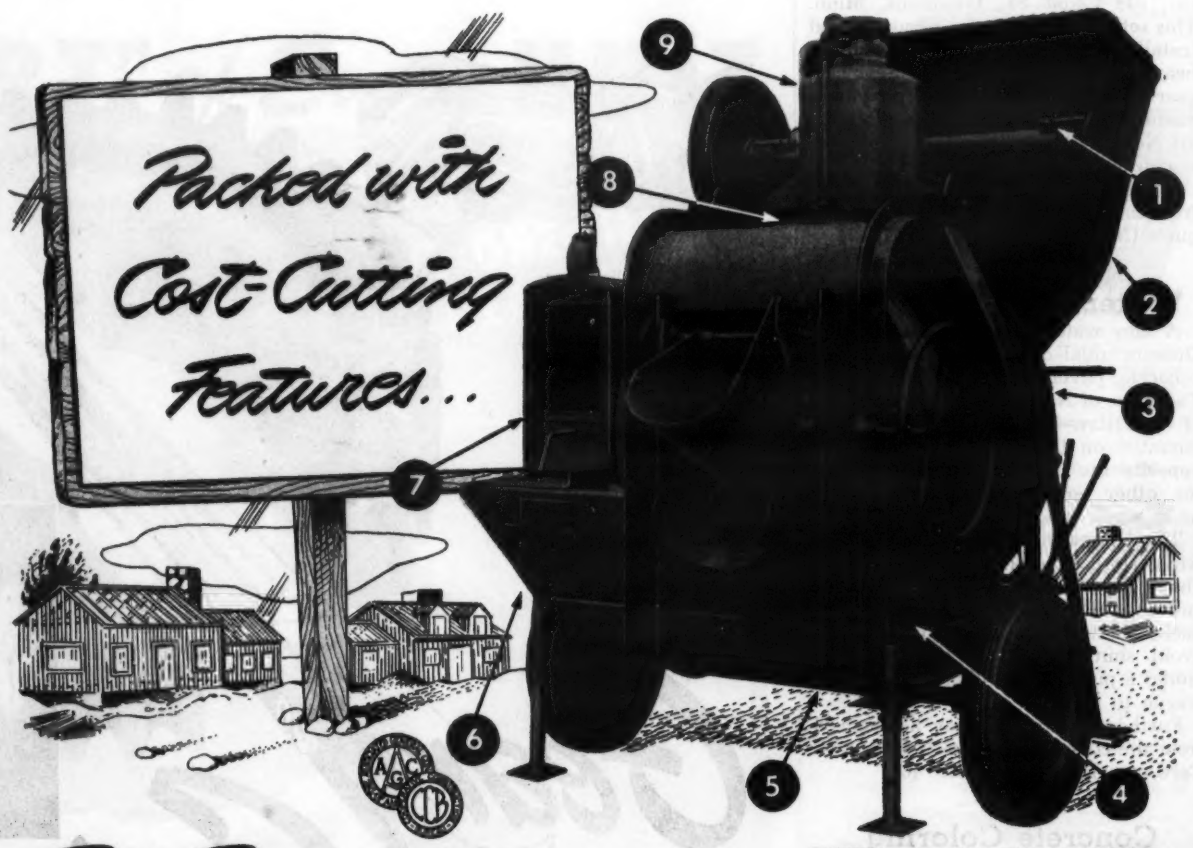

BLUE BRUTE design shows you what to look for in a portable mixer

Give a Worthington-Ransome Blue Brute 11-S or 16-S Portable Mixer a thorough going over — and get a real revelation of how far mixer-design has advanced! For example: ❶ *skip cable* winding shaft, mounted on self-aligning bearings, has grooved spools for longer cable life; ❷ *power loader* with automatic knock-out and brake set when skip raises to charging position; ❸ *skip vibrator*, simple and effective, assures quick transfer of materials from skip to drum; ❹ *drum rollers* of genuine car wheel metal with chilled treads — each roller mounted on two Timken bearings; ❺ *roller sub-frame* under drum prevents concrete accumulation on roller shaft or bearings; ❻ *countershaft* of heat-treated alloy steel in self-aligning ball bearings — all units easily accessible; ❼ *engine* mounted with radiator facing mixer's discharge side avoids dust, clogging and overheating; ❽ *drum drive gear* of one-piece semi-steel casting, machined to true circle; ❾ *water tanks* of accurate, exclusive spiral cut-off type — no rubber to deteriorate.

These and many other features — including Ransome's perfected mixing action, famous for producing better quality concrete — are the reasons why construction men everywhere depend on Blue Brute Portable Mixers for more concrete at less cost. See your nearby Worthington-Ransome distributor for performance facts that prove *there's more worth in a Blue Brute.* RS-8

A Blue Brute 16-S Portable Mixer speeds operations on a big housing project in Springfield Gardens, Long Island, N. Y. This machine is one of a fleet of both 16-S and 11-S Blue Brutes owned by Angelo Aragone, who says: "I am well pleased with their performance and economy."

Worthington Pump and Machinery Corporation, Worthington Construction Equipment Dept., Harrison, N. J.
Distributors in all principal cities

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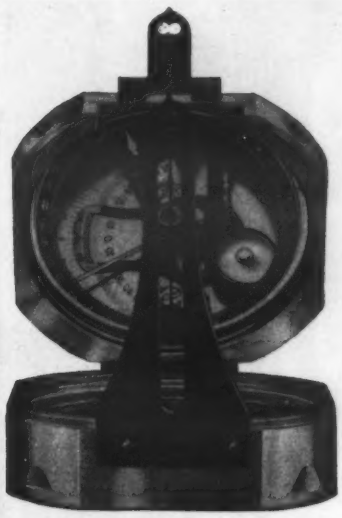


The Brunton pocket transit can be used as a prismatic compass for horizontal angles or courses, held at eye level in the position shown.

Preliminary Surveys With Pocket Transit

A pocket transit for use in running preliminary surveys is manufactured by Wm. Ainsworth & Sons, Inc., 2151 Lawrence St., Denver 2, Colo. When closed, the Brunton transit measures 2¾ x 3 x 1⅛ inches. It has a total weight of 8½ ounces.

The transit can be used for determining horizontal or vertical angles, as a prismatic compass for horizontal angles or courses, as an alidade, and as a clinometer. Essentially it is a magnetic needle set in an accurately graduated circle and enclosed in a case which opens into a versatile sighting arrangement.

Brunton compasses are graduated in quadrants of 0-90-0 with a vertical-angle vernier which reads to 10 minutes. The compass circles are available with graduations 0-360 degrees as well as in quadrants 0-90-0. The grade scale is graduated from 0-100 in divisions of 5 per cent. The cover of the case has a table of natural sines for angles from 1 to 45 degrees. A locking device, operated automatically by the opening and closing of the lid, protects the jewel bearing of the compass needle.

A leather case with belt loop or sling strap can be provided for holding the Brunton transit. Accessories available to increase its usefulness include an alidade protractor, ball-and-socket tripod head, tubular extension tripod, and Jacob-staff thimble.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 10.

Stump Removing Tool

Equipment for removing stumps, or for cutting them to grade, is available from the P. K. Lindsay Co., 97 Tileston St., Everett 49, Mass. It consists of a specially designed stump gouge driven by a Lindsay Model T-22 portable air compressor. According to the company, hardwood stumps up to 46 inches in diameter have been removed to 4 inches below grade level in 3 hours and 20 minutes, using this set-up.

The Lindsay air compressors are gasoline-engine-driven and are available in a wide range of sizes to meet various compressed-air needs. The company recommends them for drilling, light paving-breaking, tamping, backfill, spraying, chipping, and other types of equipment used by contractors.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 86.

Missouri Engineers Move

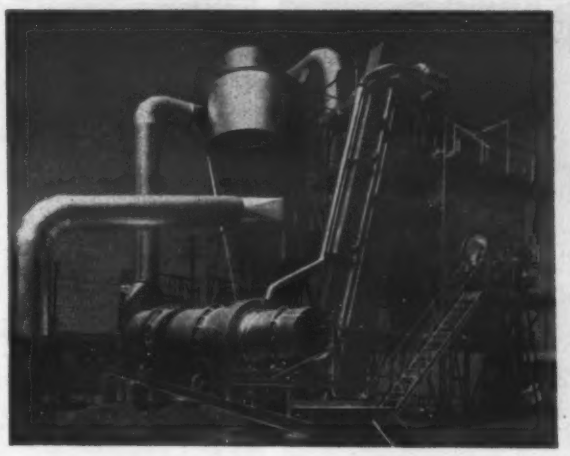
Murer & Smith, Consulting Engineers and Contractors, Clayton, Mo., announce the removal of their offices to 440 S. Brentwood Blvd.

Portable Screening Plant

A portable screening plant is described in a catalog issued by the Iowa Mfg. Co., 916 N. 16th St., Cedar Rapids, Iowa. It consists of a horizontal vibrating screen, channel-frame conveyors, and a diesel power unit—all mounted on a pneumatic-tired steel truck. The plant is recommended by the company for aggregate production where no crushing is necessary, or with portable crushing plants where additional screening is needed.

Bulletin PSP-1 features a cut-away side view of the plant showing the flow of material through it and the location of its parts. Accompanying this list is a table of specifications covering the plant's dimensions, screen, conveyors, truck mounting, power unit, clutches, frame, drive, and road clearance. The bulletin also describes the general features of the unit.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 41.



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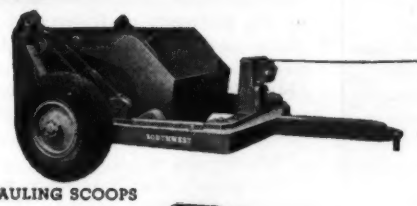
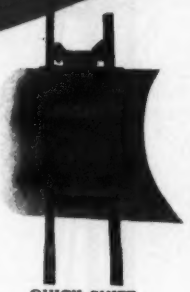
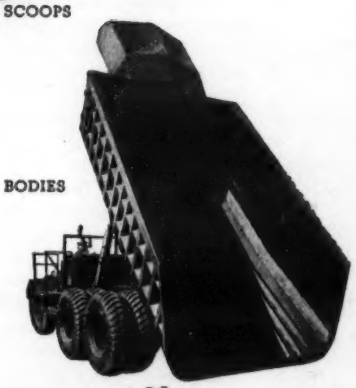


HAULING SCOOPS



QUICK SHIFT ROOTERS



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Southwest's complete, standardized line affords construction men an opportunity to fill their needs from one dependable source. From start to finish, no matter whether Allis-Chalmers, Caterpillar, International or Cletrac tractors are used, an economical Southwest unit is available to bring you increased profits.

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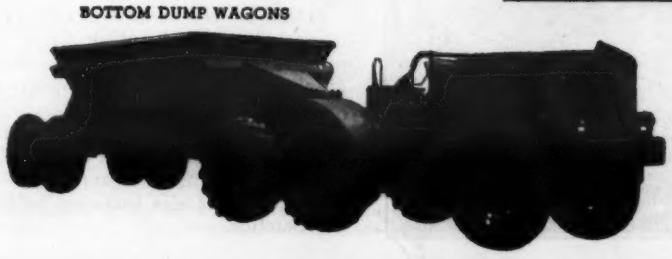
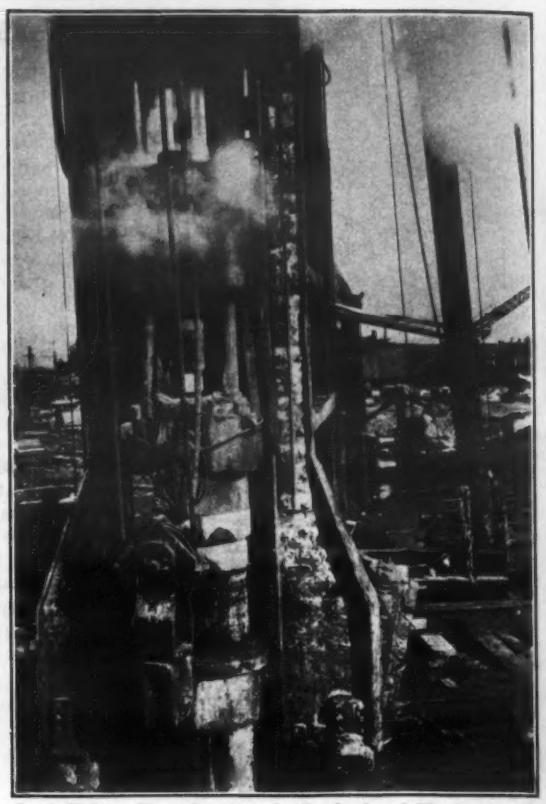


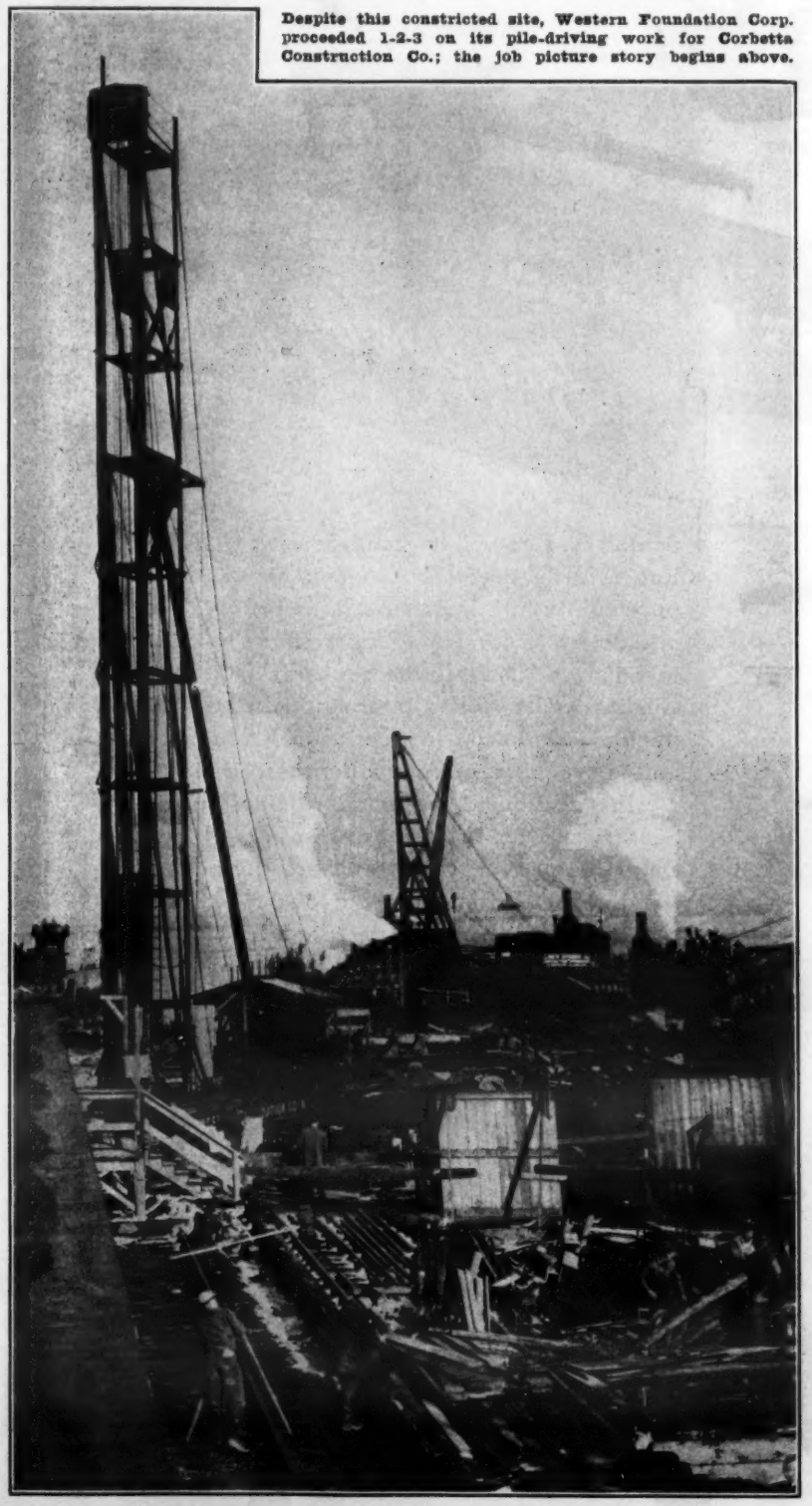
BRUSHCUTTERS

1. First, a wheelbarrow load of concrete is dumped into the footing where the composite pile is to be spotted.

2. Then the heavy-wall casing, with a slightly shorter close-fitting core inside, is lowered into the footing.



3. A Vulcan No. 0 hammer in the leads of Western's pile driver thuds up and down on the casing's driving collar.



Despite this constricted site, Western Foundation Corp. proceeded 1-2-3 on its pile-driving work for Corbetta Construction Co.; the job picture story begins above.

Piles Are Driven

New Driven-Core Composite Piles Will Carry Heavy Loads at Staten Island, New York City, Project

By WILLIAM H. QUIRK,
Eastern Editor

✦ DRIVEN-CORE composite piles designed for loads up to 144 tons have been driven as a foundation for the Ferry Terminal at Staten Island, New York City. This modern terminal which is being constructed at St. George in the Borough of Richmond will replace an obsolete structure that was completely destroyed by fire in June, 1946. Work on it got under way early in 1948, and the project is scheduled for completion in 1950 at an estimated cost of $20,000,000.

Temporary facilities have permitted ferry service to continue during the construction. However, the terminal renders more than just ferry service to Manhattan and Brooklyn; it also provides connections to bus and rail transportation serving the hinterlands of Staten Island.

The Ferry Terminal was designed and its construction is being supervised by Madigan-Hyland, New York consulting engineers retained for this project by the Department of Marine & Aviation of New York City. This article covers in particular the work of the Western Foundation Corp., of New York and Chicago, which drove the piles for the entrance and exit ramps, the abutment at Richmond Terrace, the station platforms, and the terminal building itself. The pile driving was done for the Corbetta Construction Co. of New York City, which held the substructure contract for the terminal-building foundation and part of the superstructure, the ramps, walls, and platforms.

J. Rich Steers, Inc., Contracting Engineers, also of New York City, drove piles for four new ferry slips for the Manhattan ferry, and two new slips for the 69th Street Brooklyn ferry. The piles on the latter contract were mostly timber, and were driven both by land and floating pile-driving rigs. The Steers contract also included bulkhead construction.

Constricted Quarters

The ferry-terminal area lies at the northern tip of Staten Island in quarters which are constricted because of existing facilities and the topography of the land. In back of the six ferry slips jutting out into Upper New York Bay is the new terminal building, with the entrance ramp on the left or east side and the exit ramp on the west or right side as one approaches from the water. Off to the right are the storage tracks of the Baltimore and Ohio Railroad. To the rear of the terminal are the six railroad station platforms that serve the tracks of the Staten Island Rapid Transit Railway. These tracks run back a short way from the platforms, and then converge into a two-track tunnel which bores under Richmond Terrace, a main thoroughfare on top of the abruptly rising high ground at the rear of the terminal area. Against this terrace embankment the 154½-foot-long concrete abutment wall was constructed. The entrance and exit ramps connect with Richmond Terrace.

Deep water off shore, and high ground a short distance back from the edge of the bay, placed the construction site where it is. Each of the ramps is about 1,200 feet long and has a 40-foot roadway; each consists in major part of concrete footings and columns in trestle-bent construction supporting steel girders and a concrete deck. The six platforms at the railroad station are of similar construction; each is 280 feet long x 9½ feet wide. The footings in these structures are supported on the driven-core composite piles which extend 6 inches into the footings. Spacing of piles varies considerably according to conditions, the average being between 3 and 8 feet.

This particular type of pile was used for the first time on this job, and was designed expressly for this type of structure. The piles are made up of materials that were readily available, they can be driven quickly and with a minimum of difficulty, and they are capable of supporting very heavy loads. There were delays in the pile-driving operations, but they came during the work on the station platforms. No piles could be driven on a new platform until the completed one was made ready for

(*Continued on next page*)

4. With the casing driven to refusal, the core, which is attached inside the driving head by a sling, is lifted out.

5. Next, an Armco open-end corrugated shell is lowered into the drive casing to rest on the concrete.

6. Workmen now prepare to lower a steel H-beam section into the shell. Lugs welded to it center it in the shell.

For Foundation of Ferry Terminal

service and the temporary platform being used was demolished. At one time this resulted in a five-week delay in driving.

Driven-Core Composite Piles

These driven-core composite piles range in length from 10 to 45 feet. In driving them, a heavy-wall casing was used with a 19-inch outside diameter and 1-inch-thick steel walls. The bottom of the casing was reinforced on the outside with a "shoe" of tempered steel. Inside the casing is a slightly shorter close-fitting core. The core has a 14-inch outside diameter and ½-inch walls. On the bottom of the core is welded a 1½-inch plate. Both the casing and core are driven together to refusal. Driving was aided by welding a tapered ring to the bottom of the plate; the ring tapered down in diameter from 16½ inches to 12½ inches. Two driving rigs of the Western Foundation Corp. were used on the job.

All C. & E. M. Photos

Before any driving was done, a wheelbarrow of concrete was first dumped on the ground in the footing where the pile was to be spotted. The wheelbarrow was handled from a line on the driver. The casings were then driven to refusal, or with the final penetration of 15 blows to the inch in the soft rock, mostly serpentine formation. The depth at which rock was found varied greatly over the job site, the overburden becoming shallower the farther back from the shore line.

On top of the outside of the casing is a driving collar on which is seated the driving head of the pile hammer. The 14-inch inner pipe core extends up inside the driving head to which it is attached by a sling.

Pile Drivers

The two skid-type pile-driving rigs were similar, except that one rig had an American 2-drum hoist while the other had a Lambert 2-drum hoist. Both had 90-foot steel box leads, were powered by 60-hp coal-burning boilers, and were equipped with Vulcan No. 0 hammers. They were maneuvered in both directions on top of six running beams—12-inch WF 74-pound members 40 feet long. Four of the beams were always under the driver, with the other two at one side ready for use.

After the casing was driven to refusal, the core was lifted out and an Armco open-end corrugated shell was lowered into the drive casing with its bottom resting on the concrete. (Even though many of the composite piles were driven close to the edge of the water, every pile was dry on the inside.) The Armco shells were 16-gage with 15-inch inside diameters, and came in 50-foot pieces which were cut with a torch to the desired length.

Next a steel H-beam section was lowered into the shell which was then filled with concrete. All the H-beams were 8-inch size, but with four different weights—31, 40, 58, and 67 pounds—designed to carry a specified part of the ultimate load. The beam was left long enough so that it projected 4 to 6 feet from the shell, thus providing enough room for the hammer to make contact for driving.

Materials Handling

The Armco shells were shipped from Middletown, Ohio, and the H-beams

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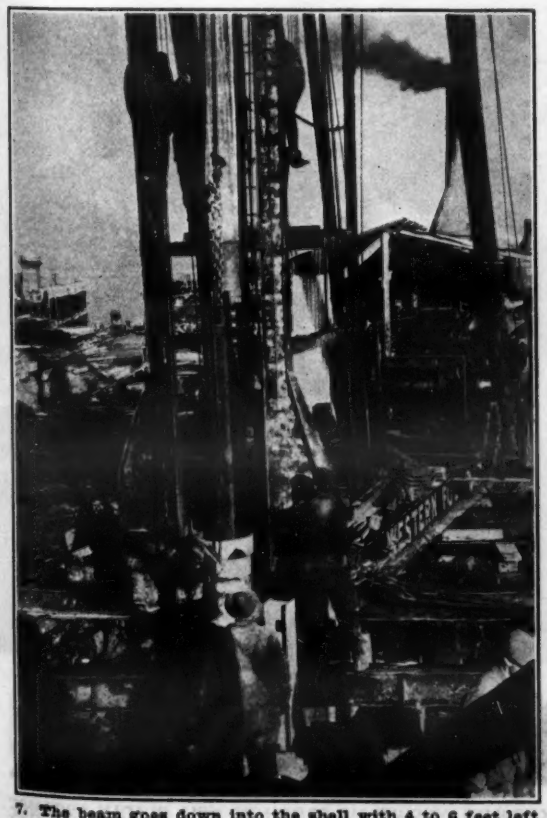
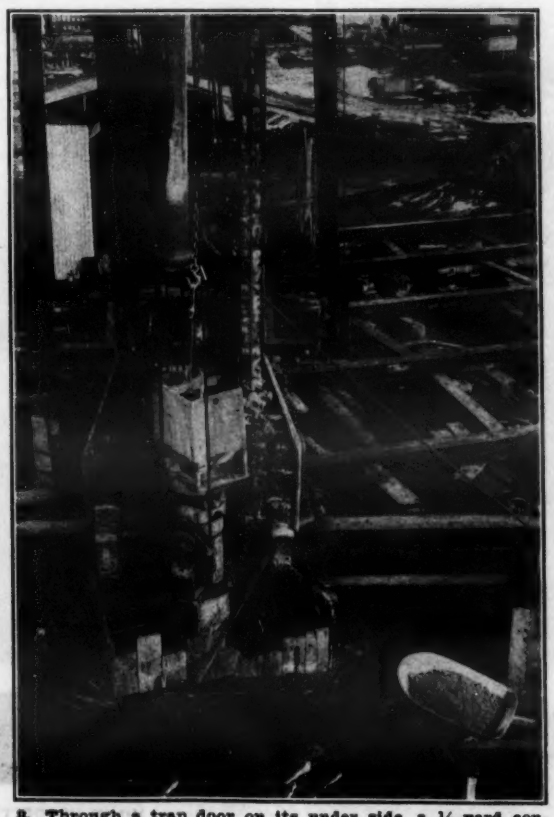
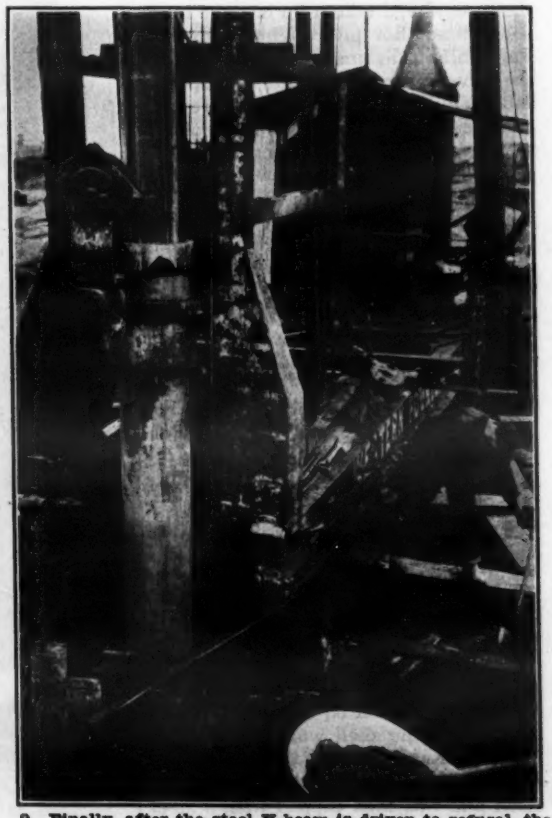


7. The beam goes down into the shell with 4 to 6 feet left sticking out so the hammer can make driving contact.



8. Through a trap door on its under side, a ¼-yard concrete bucket discharges the 1:2:4 mix into the pile.



9. Finally, after the steel H-beam is driven to refusal, the heavy casing is removed with a special luff tackle.

Piles Are Driven For Ferry Terminal

(*Continued from preceding page*)

from the Bethlehem Steel Co. at Bethlehem, Pa. Both came by rail to the siding of the B. & O. Railroad and the Staten Island Rapid Transit Railway at one end of the job site. They were unloaded by an International T-9 tractor equipped with a swing crane, and hauled to the desired location on a flat-bed truck. The tractor-crane had a 20-foot boom with a 2-ton lift, and easily handled the 25 to 60-foot steel sections. When necessary the steel members were spliced by welding with a G-E 300-amp electric welding machine. A 3-pass splice was made, with a diamond splice plate on each side of the web. The shells were also welded when necessary to make up the various lengths; No. 9 wire was employed on the shell welding.

Materials for the concrete were supplied by the general contractor, but were mixed by the Western Foundation Corp. at the south end of the site in a Ransome 16-S mixer. The 1:2:4 mix was then carried by Scoopmobile to the pile being filled, where it was transferred to ½-yard concrete buckets with trap doors built in the bottom. The buckets were lifted to the top of the shell and the concrete was discharged into the pile. Usually two buckets of concrete sufficed for a 16 to 18-foot pile. The handling of the steel beams, the corrugated shells, and the concrete buckets was all done by the driving rig using a rope pile line.

The inner core was then lowered to rest on top of the steel-beam H-section, which was driven to refusal in the soft rock with 15 blows to the last inch. Penetration into the rock varied from 3 to 12 feet. In order to center the beams in the shell before the concrete was placed, eight lugs were welded to the steel sections—one set of four located about 4 feet from the bottom, and the remaining four lugs about 15 feet farther up the beam. With these lugs a ½-inch clearance was maintained around the beams, and they were kept from sticking or getting out of plumb in the shells.

Removing the Casing

With the H-section driven to refusal, a composite pile of steel and concrete was obtained, capable of carrying extremely heavy loads. The next step was to remove the heavy casing from the ground and take it up into the leads so that another pile might be driven. For pulling against earth resistance, the drivers were equipped with a special luff-tackle arrangement, and were also designed with a pulling strength of 100 to 125 tons. When the casing was being pulled, the hammer line was slacked off so that the full weight of the hammer rested on the core and H-section. In this way only about half the pull was transmitted through the leads, which might have been subject to buckling if they had had to take the full load.

On the top of each driver were two sets of 5-blocks, the 10 parts reeved up with ½-inch cable. The 5-blocks exerted a theoretical pull of 50 tons. The big pull, however, was made with a special luff-tackle arrangement—using a 1¼-inch cable—with a theoretical pull of 100 tons. Its big diamond sheave was attached to the collar around the top of the casing, and was connected to the 5-blocks above with a double luff. When the pull was exerted, the casing slid out of the ground leaving the composite pile—the H-section in the concrete-filled shell—securely in position.

The beam and shell were then cut off at the same desired elevation. The concrete in the shell was kept about 2 inches below the cut-off grade, and this top section was filled in with grout. Each pile was then capped with a steel plate 18 inches square x 1 inch thick.

Western Foundation Corp. Photo

This view of the work site for the ferry-terminal job gives some idea of the cramped quarters in which men and equipment worked and materials were hauled. Shown also is one of the two pile-driving rigs Western employed.

A 3-inch hole in the center of the plate permitted the grout to ooze through as the plate was pushed down to make contact with the top of the H-section. In this way the plate was prevented from slipping or sliding.

The general contractor then constructed pile cap footings around the pile clusters. The caps were built of reinforced concrete 33 to 48 inches thick. Under the terminal building itself the footings usually included either 3 or 4 piles. In the 3-pile footings the piles had an average spacing of 3 feet, while in the 4-pile footings the average spacing was 4 feet.

Other Pile Work

This contract called for 1,368 driven-core composite piles, 450 timber piles, and 66 batter pipe piles. The creosoted-timber piles were scattered around in the entrance and exit ramps, storage and boiler-room areas, and at the station platforms. They averaged 20 feet in length, had 14-inch butts and 8-inch

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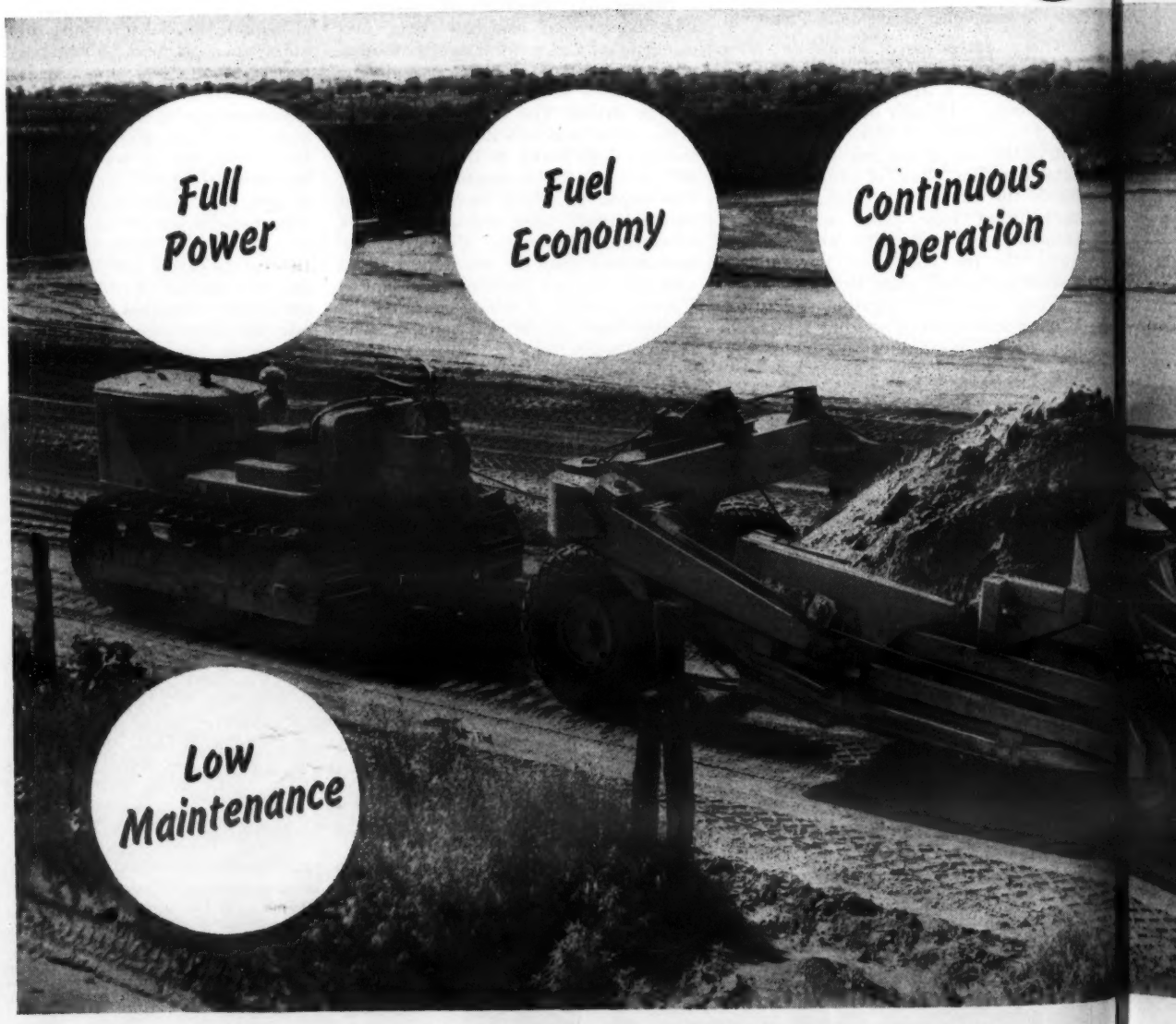
SINCLAIR TENOL of Maintaining



SINCLAIR

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tips, and carried a maximum design load of 20 tons. They were supplied by the Joslyn Co. of Baltimore, Md., and were equipped with American metal shoe tips, a welded protection forming a point with 45-degree sides.

The batter piles, also in short lengths, consisted of 16-inch-diameter steel pipe with ⅜-inch walls, and were driven with open ends. They were cleaned out by jetting, then filled with concrete; they contained no core. The batter piles are located in the exit ramp, and were driven by a Marion No. 21 crane equipped with 60-foot leads and an adjustable A-frame which moved in and out to suit the required batter. Driving was done by a Vulcan No. 1 hammer powered by the coal-burning boiler on the steam driving rig.

More than 15 load tests were made on the driven-core composite piles. A load test made on one of the first piles that were driven (designed for 80 tons) disclosed that 216 tons was supported by the pile. In this test the total settlement was less than ½ inch, but the pile recovered to 3/16-inch final settlement. In making this test, a concrete cap 3 x 3 x 2½ feet thick was built over the the pile. Above the cap a wooden box 20 feet square was constructed and loaded with sand. The sides were extended upward until the loading had reached 216 tons, the sand being added in 20-ton increments. This particular pile had an 8-inch 40-pound H-section beam inside the 16-inch-diameter shell.

C. & E. M. Photo

Concrete was transported by this Scoopmobile from the mixer at the south end of the job site to the pile being filled. There it was tranferred to ½-yard concrete buckets which deposited the mix in the shells. Two buckets usually sufficed for a pile.

Quantities and Personnel

The major items in the $1,500,000 contract held by the Corbetta Construction Co., which included the pile-driving work of the Western Foundation Corp., were as follows:

Excavation	45,000 cu. yds.
Concrete	8,580 cu. yds.
Reinforcing steel	220 tons
Miscellaneous iron and steel	65 tons
Composite piles	35,000 lin. ft.
Timber piles	9,000 lin. ft.

One driving rig had a crew of about 15. This included welders in addition to the operators, dock builders, and laborers. Personnel was somewhat numerous because of the long distance that material was hauled from the railroad siding to where the piles were driven. The site was so congested that material could not conveniently be stored in a single place, and this resulted in a great deal of handling.

By March, 1949, Western Foundation Corp. had completed its pile driving. Bethlehem Steel Co. planned to start erecting steel for the superstructure in April. Some of the new terminal facilities will be ready to give service before the end of 1949, while the entire project is scheduled for completion early in 1950.

For Madigan-Hyland, the consulting engineers on the Staten Island Ferry Terminal, Bob Edmondson was Resident Engineer on the pile-driving work, and Harry Lynch was Inspector. The Corbetta Construction Co. was represented by Mario Egidi, Superintendent. Monty Milbury was Superintendent for the Western Foundation Corp., assisted by Joseph De Gange.

Shock-Absorber Seat For Wheel Tractors

A shock-absorbing constant-level tractor seat is available from the Fleischer & Schmid Corp., Columbus, Nebr. The Joy Rider seat is said to permit the operator to ride horizontally regardless of the angle of the tractor. This is accomplished by a specially constructed sleeve which operates through a side swivel action. A hydraulic shock absorber is designed to supply a passenger-car type of ride.

An adjustment on the seat provides for differences in weights of various operators. The spring tension is controlled by raising or lowering one end of the spring through a hand crank. Another feature claimed for the Joy Rider seat is that its tilt-back construction allows it to fold completely out of the way. The Joy Rider is available for use with most popular makes of wheel tractors.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 73.

Dragline-Bucket Handbook

A revised edition of "How to Get the Most Out of a Page Automatic Dragline Bucket" is now available from the Page Engineering Co., Clearing P. O., Chicago 38, Ill. This 20-page booklet with its detailed information on dragline operations is virtually a handbook for operators. Some of the subjects discussed and illustrated are: how to select the right size of bucket; how the bucket operates; how to use it; and how to care for it to get maximum production.

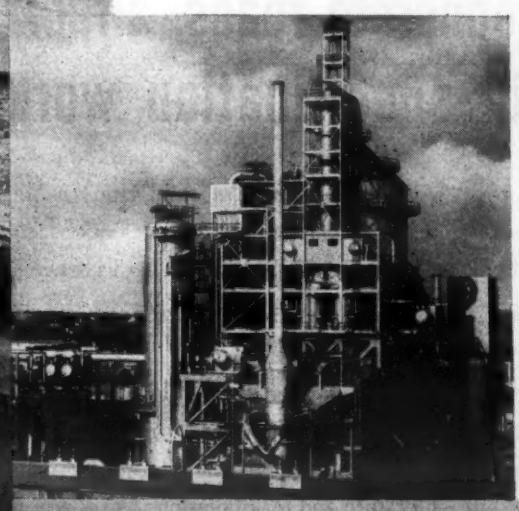
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 75.

Solves the Problems Full-Time Operation

Every operator has before him four big objectives. He requires Full Power from the engine and Low Fuel Consumption. He wants Uninterrupted Operation and Low Maintenance. When Sinclair TENOL is the lubricant, the operator can accomplish all these aims.

TENOL retards oxidation effects and reduces gum, varnish, and engine deposits to ward off valve sticking and thus promotes full power output. Combustion compounds, unburned fuel, carbon and soot, resins, dust and dirt remain suspended and are carried away in the oil draining. They do not accumulate as sludge to cause sticking and clogging.

TENOL helps maintain top production continuously . . . giving full power every hour in every day.



New Fluid Catalytic Cracking Stills (like the one shown here) are helping to expand Sinclair's refinery output. Sinclair's great refineries are now turning out products at the rate of 150,000,000 gallons of lubricating oil yearly.

About 40% of all the Aircraft Engine Oil used by domestic Airlines in the U.S.A. is supplied by SINCLAIR. The same careful research that developed this high quality oil for the Airlines is put into TENOL and other Sinclair Oils.

HEAVY DUTY LUBRICANTS

FOR LUBRICATION COUNSEL, OR YOU MAY WRITE TO SINCLAIR REFINING COMPANY, 630 FIFTH AVE., NEW YORK 20, N. Y.

The Big Beam 400-F, a combination emergency lamp and flashing signal flare, has two independent bulbs. If one burns out, the other carries on.

Emergency Lights

Two new emergency lights have been announced by U-C Lite Mfg. Co., 1050 W. Hubbard St., Chicago 22, Ill. One is designed to provide lighting when regular electric service fails or for emergencies on construction jobs, for highway maintenance crews, etc. The other is a combination light and flare, providing a steady or a flashing light, as a signal or a light for emergency work.

The Big Beam Model No. 2-AD automatic emergency light has two large floodlights, 6 inches in diameter, with corrosion-proof swivel joints which hold the floodlights in any horizontal or vertical position. It operates on one 9-volt standard dry battery which is easily replaced. A steel container and carrying handle make it readily portable. The container is 10⅞ inches long, 5⅜ inches wide, and 7¾ inches high. With the battery, the unit weighs 18 pounds.

The other new Big Beam, Model No. 400-F, is equipped with a single-pole double-throw toggle switch which, when thrown to one side, operates the unit as a flashing flare; thrown to the other, as a steady light. It is equipped with a red Fresnel lens, but clear, amber, blue, or green lenses are also available. The lens is removed by a one-third turn, and a rubber gasket provides sealed protection for the entire socket unit. One or two standard 6-volt batteries may be used. When one is used, the other is retained as a spare. The two operating bulbs are independent of each other; if one burns out, the other continues to operate.

As a light, this model provides visibility for 600 feet in all directions, the manufacturer states; as a signal, it flashes 112 to 120 times a minute. The life of the batteries is said to be 28 hours of continuous use as a flasher, and 20 hours of continuous use as a steady light. The service life is much longer in both cases in intermittent use, the company explains.

The Model 400-F container is made of 20-gage steel, finished in rustproof weatherproof red enamel, and has a hinged overlapping cover. Lamp-to-battery contacts are permanently mounted inside the cover. The 400-F is designed to operate in any position, even if knocked over.

Further details are given in two bulletins which may be secured from the company. Or use the Request Card at page 16. For the bulletin on the Model No. 2-AD light, circle No. 101; for the one on the 400-F combination light and flare, circle No. 102.

New Conveyor-Belt Manual

Conveyor and elevator belting is described in a 24-page manual prepared by the New York Belting & Packing Co., 1 Market St., Passaic, N. J. The manual contains the latest available information on the company's 1949 line of belting.

Engineering characteristics of each type of belt in the line are listed. The catalog also contains data on carrying capacities, approximate belt weights, selection and application of elevator belts, and the construction of all types of belting available from the company.

This literature may be obtained from the company, or by using Request Card at page 16. Circle No. 69.

Why Preformed Wire Rope?

A new folder containing questions and answers on preformed wire rope has just been released by Macwhyte Co., Kenosha, Wis. Questions normally asked about this product, concerning its construction, available sizes, handling, and safety, are answered in the folder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 68.

Contractors Speed Up
Power Trenching Operations
With The
Goldak
FEATHERWEIGHT
MODEL 87
PIPE LOCATOR

- Gives EXACT location of buried pipes, mains, services, gates, tees, ells, stubs, etc.
- Easy, reliable one-man operation
- Compact, ruggedly built
- Featherweight—only 11 lbs. complete
- Guaranteed superior performance

Write for Complete Details

THE Goldak COMPANY
500 W. GLENOAKS BLVD., GLENDALE 1, CALIFORNIA

ayr-trap
the air-entraining agent

Indispensable for concrete roads, airport runways and rigid specification work

AYR-TRAP in concrete makes it more durable, increases its plasticity and minimizes segregation and bleeding. Ayr-Trap can be added at batching plants or on the job and is used in concrete for roads, exposed structures, dams, bridges and in cement mortars.

Ayr-Trap improves scaling resistance, chloride salt resistance and protects concrete against its most common failures.

Ayr-Trap permits a reduction in the water cement ratio. Small deviations under field conditions do not alter its benefits. Ayr-Trap is stable—does not deteriorate. Used in liquid form as follows:—

Use 3 liquid ozs. per cubic yard of 5 or 6 bag mix—1 pint per 5 cubic yds. 6 bag mix. Write for further detailed technical literature and for quotations.

A. C. HORN COMPANY, INC.
manufacturers of materials for building maintenance and construction
10th STREET & 44th AVENUE · LONG ISLAND CITY 1, N. Y.
HOUSTON • CHICAGO • LOS ANGELES • SAN FRANCISCO • TORONTO

SUBSIDIARY OF Sun CHEMICAL CORPORATION

There's no installation problem with the new Flow-Ting portable toolboxes. They simply drop in place under the tractor seat and are easily accessible.

Under-Seat Toolboxes

Under-seat toolboxes are made by Knoedler Manfacturers, Inc., Dept. R-9A, Streator, Ill. These twin units are designed for use with the Flow-Ting tractor seat, which is built in one model adjustable to fit all popular makes of tractors and to suit operators' weights from 75 to 275 pounds.

The Knoedler toolboxes are cold-drawn from 18-gage steel and are designed to fit snugly into the cushion-seat frame. Since they are not bolted in, they can be easily removed by raising the seat cushion, and carried right to where the work is being done. This saves running back and forth for additional tools, and helps reduce the chance of forgetting tools in the field, Knoedler points out. The twin boxes will carry all the tools normally needed for field repair and adjustments, says the manufacturer.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 45.

Supercharged Diesel

A new supercharged diesel engine is announced by the Cummins Engine Co., Inc., Columbus, Ind. The Model HRBIS-600 is designed to develop 225 hp at 1,800 rpm. Among the features claimed for it are low fuel cost, dependable operation, and long engine life. In addition to the basic model, the new engine is available in automotive, marine, and other industrial models.

The Model HRBIS-600 has a 5⅛-inch bore, 6-inch stroke, and 743-cubic-inch piston displacement. It uses a 4-stroke cycle and features the Cummins fuel distribution and injection system. Other mechanical features include standard 2-valve heads, continuous-groove main bearings, increased-flow lubricating system, buttress-type oil pan and flywheel housing, newly designed cooler for lubricating oil, and a Roots-type blower. Field conversions of the Model HRBIS-600 are possible.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 66.

Hoists and Dump Bodies

Hoists and dump bodies are described in a 12-page folder available from the Anthony Co., Streator, Ill. Anthony bodies are made in styles for both short or long-wheelbase trucks. The folder features the D Series of truck bodies and the Models 620, 620-7, 720, 724 hoists.

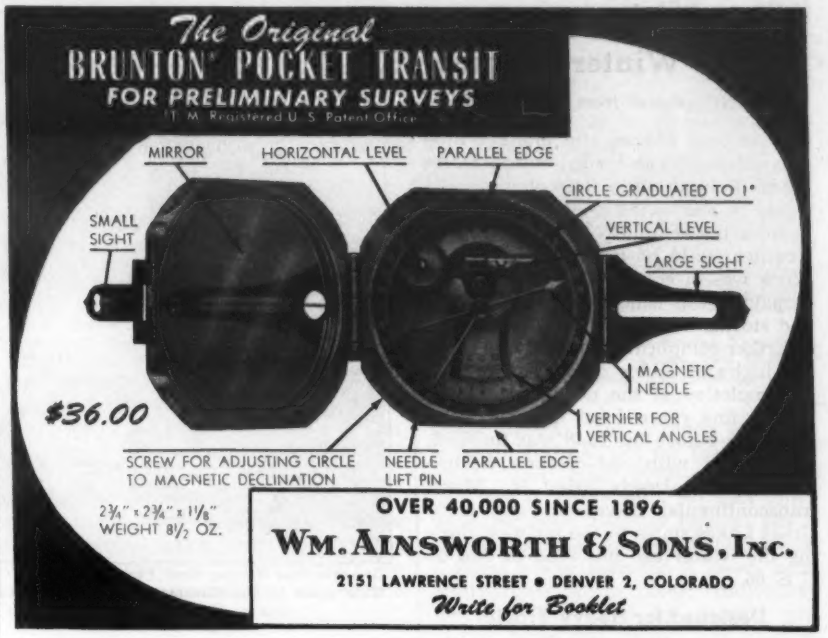
The catalog illustrates eight styles of bodies in the D Series, pointing out the features of each. A selection guide for determining which hoist to use with each of the bodies gives information on the body model, body length, capacity of the body, cab-to-axle dimension, hoist model, and the cylinder size of the hoist. General specifications cover the hoist stroke, dumping angle, and mounting height. Among the hoist features described in detail are heavy-duty design and interchangeability. Specifications listed for the truck bodies include capacities, body dimensions, level volume, and side heights.

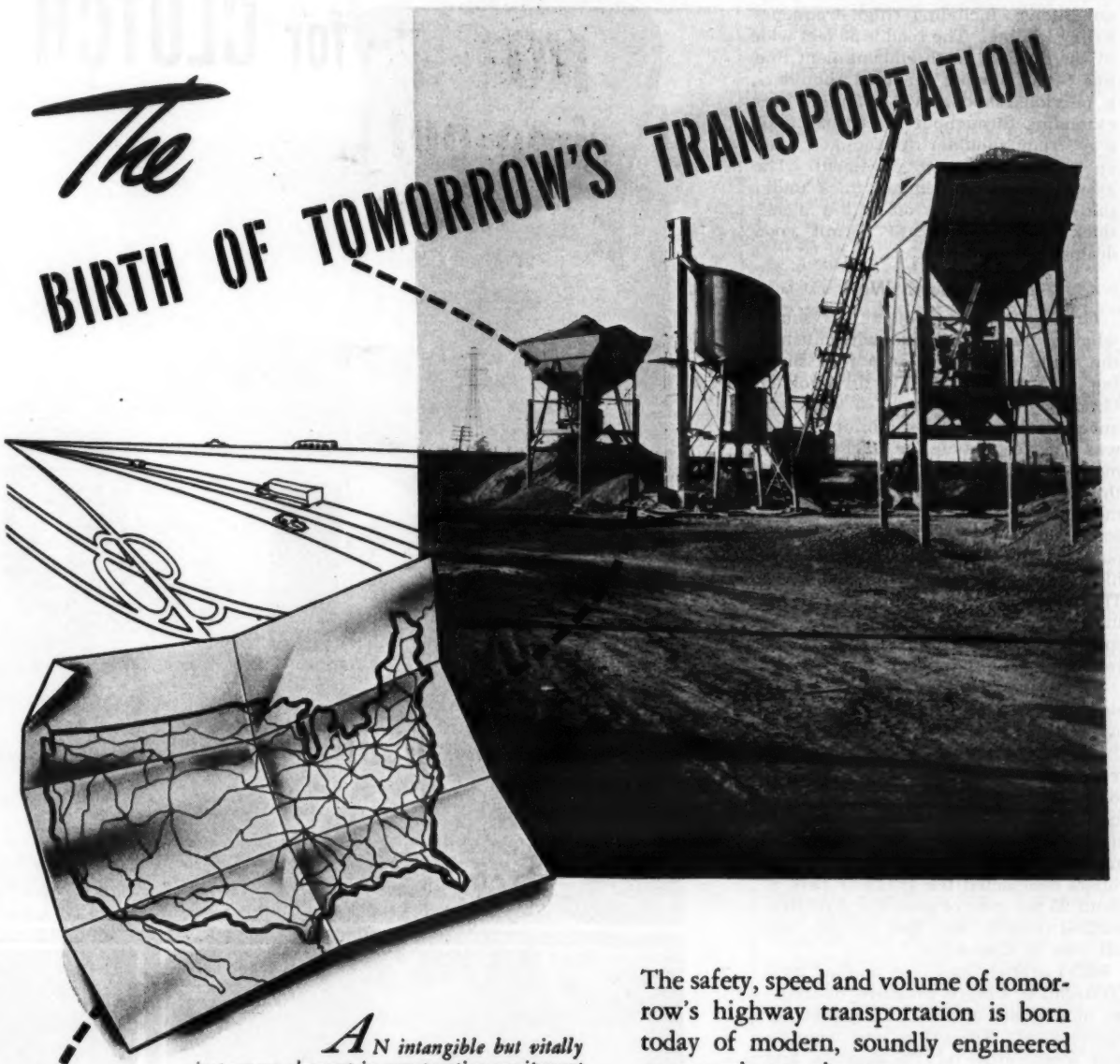
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 128.

Wood-Form Coating

A clear lacquer for use on concrete forms is manufactured by W. P. Fuller & Co., 135 N. Los Angeles St., Los Angeles 53, Calif. The features claimed for the KL-4053 form lacquer are: the form on which it is used breaks clean from the poured concrete, and the plywood panels can be used many times. The Fuller lacquer can be applied by spraying or dipping, the manufacturer states, and will not fill the pores of the concrete surface with any sort of extraneous matter.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 56.





AN intangible but vitally important element in construction equipment is the engineering which gives it structural strength, economical operation and long-life. But Butler Engineered Design goes farther: The site, the size and type of work, accessability of materials, their volume and their transport are all given careful study and are reflected in the greater efficiency of Butler Construction Equipment.

The safety, speed and volume of tomorrow's highway transportation is born today of modern, soundly engineered construction equipment.

Long delayed and long anticipated, the gigantic road construction program is today demanding unprecedented manpower, materials and equipment. The existing highways are inadequate; vast, new networks will be added.

The program is starting like an avalanche. Primary demand is equipment, and to the contractor who has it will go the great awards. Are you ready? Consult the Butler Engineer. Butler can meet your delivery requirements.

BUTLER BIN COMPANY
WAUKESHA, WISCONSIN

Hot-Mix Slab Laid In Winter Weather

(*Continued from page 1*)

mile of first course, and another mile or so of second and third-course work. Ryan-Richards used its motor graders to move the objectionable stuff clear even of the shoulders, so damage from weather could be held to a minimum. Work was of course shut down, so far as paving was concerned, during these bad storms—one time for 30 days. As a further complication, traffic was using the highway under construction.

Completion of the new job will insure a fine route from Guthrie west, and even before the road was finished, many cars with out-of-state license plates were already using it. Many transcontinental travelers going from Great Lakes states to the far west during the winter use this road in lieu of U. S. 66.

Designed for Heavy Traffic

Bearing the Federal-Aid tag F-256 (12) & (13), the new section of highway was designed for modern traffic conditions, including high-frequency heavy loading. The road is 38 feet wide at the finished earth embankment line, has 8-foot sloping graveled shoulders, a pervious sand-gravel granular base extending throughout the entire roadway from shoulder to shoulder, and an asphaltic-concrete pavement. The granular base is 6 inches thick under the slab, and tapers off to 3½ inches thick at the slopes to permit good drainage.

Routine Earth Work

Grading on the project was somewhat on the routine side, with much of the route designated only for "shaping", and with little cut or fill involved. Grading quantities were so well balanced within short haul limits that it was a perfect set-up for tractor equipment. Tractors and scrapers moved through the job rapidly. The autumn months were generally favorable, and some water was even used in the compaction of the embankments. Disks blended the moisture with the earth. The earth embankments were left fully compacted to the intent of the specifications, blue-topped, bladed, and ready for granular base.

The nearest suitable granular material was located in a native pit an average hauling distance of 10½ miles from the job. It was loaded to a fleet of trucks by power shovel, hauled to the job, spread by a Caterpillar No. 12 motor grader, and road-mixed thoroughly with water before being cut out in thin lifts and spread. Pneumatic rollers compacted the granular base to about 95 per cent of modified AASHO-method density, and this in turn was left true to blue-tops.

MC-1 asphalt was then applied by a 1,000-gallon Etnyre pressure distributor at the rate of about 0.3 gallon per square yard. The prime coat went on at a temperature of 135 degrees, and some traffic was permitted while it cured out ahead of the paving work. In general, the distributor worked about a mile ahead of the laydown machine, but sometimes the priming was as much as 4 miles ahead in slow-curing weather. The distributor shot the bitumen over half the paving width.

Asphalt Plant Is Set Up

By the time enough grade had been made ahead, Ryan-Richards had arranged for a supply of hot-mix asphaltic-concrete materials, and set up a Cummer 4,000-pound hot-asphalt plant. This plant is an old-timer so far as Oklahoma paving goes, having seen 9 years of service on highway work, war work, and the Altus Airbase.

The site for the plant was about ½ mile east of the town of Kingfisher, in an area where there was plenty of room to set the equipment up for the maximum production and hauling efficiency. The plant was set up for "straight-line" operation, with the boiler off slightly to one side out of the way. A haul road was built to permit the trucks to head in, drive under the batch plant, and drive on out without having to back up or turn.

Oklahoma State Highway Dept. Photo

This view of the Cummer asphalt plant on the Ryan-Richards job shows one of the driers, the hot elevator, weigh plant, and transformer station.

Four sizes of mineral filler were required for the mix. Crushed rock of 1½-inch-maximum size was shipped by railroad from the Richards Quarry near Lawton, Okla. Miami chat was shipped by railroad from northeastern Oklahoma. Coarse Dover sand came in by truck from Dover, Okla., and the 80 to 200-mesh fines were supplied locally.

Because of the possible bad weather ahead, Ryan-Richards wisely stockpiled about 75 per cent of the mineral filler required, late in the fall. This was one of the factors which permitted work to proceed on those few good days which came occasionally between the bad-weather storms.

(*Continued on next page*)

KOEHRING DUMPTORS* have the same heavy-duty qualities and big-production ability as Koehring excavators . . . combined, they give you matched excavating-hauling efficiency. Rugged 6-yard rock body . . . plus a ton of Dumptor strength for every ton of payload, withstand severest shocks of shovel loading and roughest off-road hauling. Constant-mesh transmission and 3 fast speeds, forward and reverse, provide no-turn shuttle hauling. 1-second gravity dump saves more time every trip.

*Trademark Reg. U. S. Pat. Off.

KOEHRING COMPANY
Milwaukee 10, Wisconsin
Subsidiaries: JOHNSON • PARSONS • KWIK-MIX

Oklahoma State Highway Dept. Photo
The Ford truck at left is dumping hot-mix to the hopper of a Barber-Greene Tamping-Leveling Finisher which Ryan-Richards used on its Oklahoma job. Above, two Buffalo-Springfield tandem rollers work behind the Finisher in cold-weather close-up.

The mix was set up on the basis of 40 per cent rock, 28 per cent chat, 10 per cent Dover sand, and 22 per cent local fines, with from 5 to 6 per cent of 85 to 100-penetration asphaltic cement. This held true for the two bottom courses, while the top course contained ½-inch-maximum size rock.

Asphaltic cement was purchased hot at the Kerr-Magee refinery at Wynnewood, Okla., and was trucked in hot. Ordinarily the three transports had no trouble disposing of their 3,465-gallon loads. When the weather was exceptionally cold, however, a small Cleaver-Brooks car heater raised the asphalt temperature rapidly, and the bitumen was pumped out by a Kinney asphalt pump.

Approximately 26,000 gallons of asphalt storage was available at the site in three steel tanks which were heated by steam coils. A 3-inch Kinney asphalt pump powered by an electric motor supplied hot bitumen from the tanks to the hot pot on the Cummer plant. Two other 5,000-gallon tanks held MC-1 prime oil. No fuel tanks were required, because natural gas is plentiful almost anywhere in Oklahoma.

Plant power included a 75-hp locomotive-type steam boiler, stationary-mounted and fired by natural gas. Steam from this boiler was used to heat the material in the asphalt tanks, to heat the steam jacket at the pugmill, and to operate the pugmill rams.

Auxiliary power for the plant is all electric and was secured directly from local transmission lines. A transformer bank at the plant stepped the current down for use.

Electric motors varied in horsepower, from the 60-hp motor which operated the pugmill to the small 5-hp installations on the vibrating screens and the Kinney asphalt pump. Motors of 20 and 30 hp drove the forced-draft blowers, a 30 and 50-hp set of motors operated the two driers, and a 10-hp motor was used on the hot elevator. All motors were General Electric.

Asphalt moved through the plant in more or less routine fashion, making a full circulating loop. What material was not needed in the hot pot bypassed back to the storage tanks.

Mineral aggregate, on the other hand, followed a somewhat complicated and out-of-the-ordinary route. First of all, it was dumped in stockpiles over a feeder bin with four gates. The feed to these gates was assured by a Northwest Model 25 clamshell, using a ¾-yard clam bucket. By controlling the flow of the various kinds of material at these gates, the plant foreman met the mix requirements farther on at the vibrating screens.

One of the changes which Ryan-Richards has made in this hot plant has been the addition of a conveyor-belt line to carry the raw-run material up to the receiving hopper over the driers. This function was formerly handled by a cold elevator. The rock drops down into two 28-foot driers, one 5 feet in diameter, the other 5½. The addition of a second drier was another change from original design, in order to boost output during wet-aggregate runs.

After the rock in the driers was heated to a temperature of approximately 350 degrees to remove all the moisture, a 50-foot enclosed hot bucket elevator raised the material to the vibrating screens for sizing.

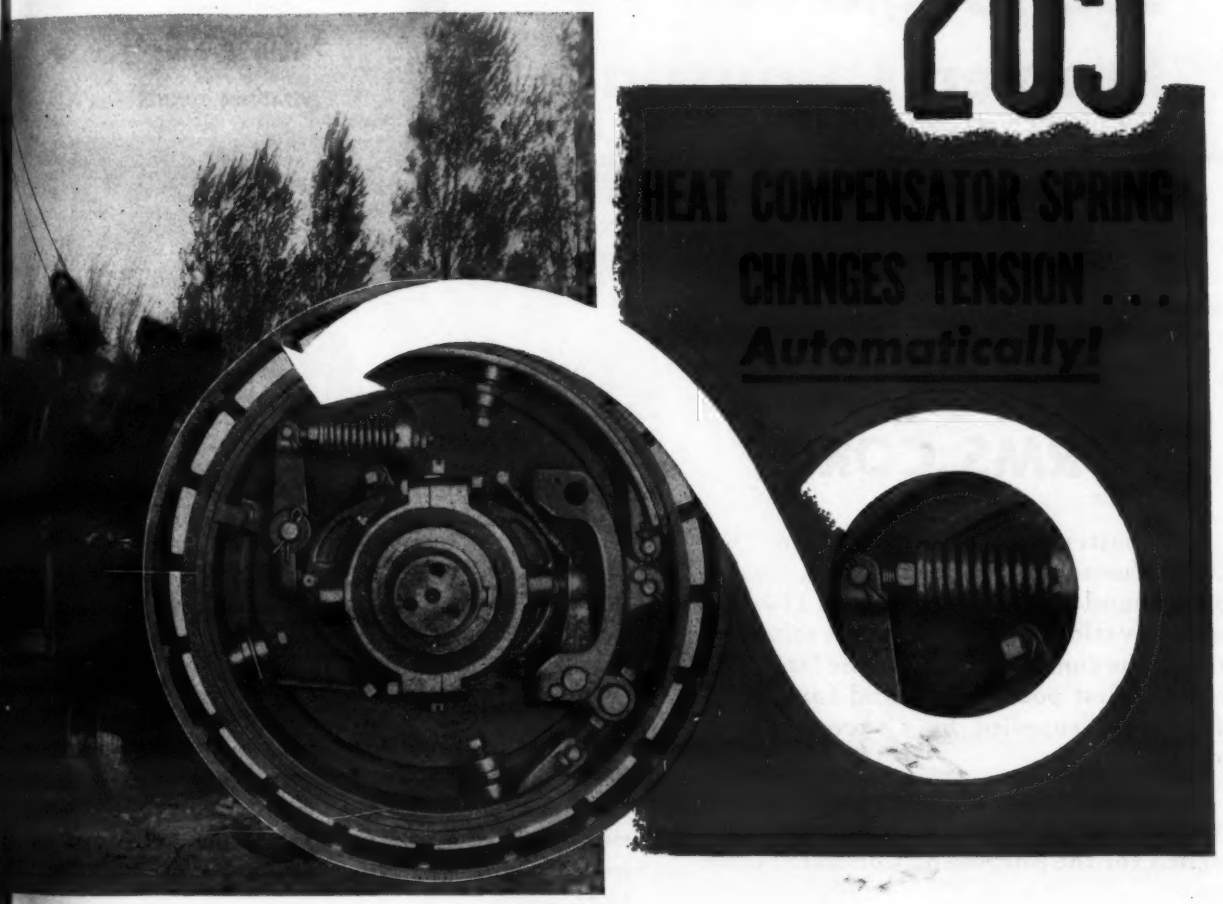
On this job, two decks of 4 x 8-foot screens were used. The upper deck consisted of split sections, half the deck covered with 1½-inch mesh, the other half with ½-inch. The lower deck was similarly divided between ⅝-inch and No. 6 mesh. These screens classified the rock according to size and dropped it down to the proper hot bins where it could be weighed out in the weighing hopper.

From the weighing hopper, the hot aggregate passed to the pugmill, where it was mixed with the hot asphalt at a temperature of about 325 degrees. Mixing time on this job was 60 seconds.

The finished mix was then dumped to the beds of a fleet of rented trucks,

(*Continued on next page*)

with KOEHRING HALF-YARD 205



● With Koehring ½-yard 205, there's no time-out for continuous manual clutch adjustments. It's no longer necessary for operator to tighten cold clutches when he starts in the morning, or between shifts . . . then loosen them again when clutches warm up. Large compensator springs on the 205's main drum (above), swing and traction clutches automatically make all tension changes . . . maintain full clutch efficiency. No "compromise" settings . . . you get top production all through the shift . . . have accurate, smooth control at all times. Gives you bigger daily yardage as shovel, dragline or pull shovel . . . is equally important on clamshell and heavy lift crane service, where you have intermittent usage.

Also, with Koehring 205 you get double-fulcrum control linkage on crowd-retract and traction that eliminates overtravel, drag and chatter . . . independent traction, to travel, swing and operate boom all at same time . . . full choice of crawler, truck or cruiser mounting to best fit your operating requirements. Your local Koehring distributor can show you many other 205 features that will save time and assure more production at lower cost on *your* work. See him *today*.

OTHER KOEHRING EXCAVATOR SIZES: ¾ yd. 304 • 1½ yd. 605 • 2½ yd. 1005

Hot-Mix Slab Laid In Winter Weather

(*Continued from preceding page*)

each hauling four of the 4,000-pound batches. The trucks were weighed, a ticket went to the driver, and the total of these tickets for the day formed the basis for the paving foreman's report. The best day's run for the job was 1,000 tons in 9 hours, but the general average was close behind this figure.

Placing the Mix

A somewhat flexible number of hauling trucks had to be used through the job, because the length of haul varied from day to day. Paving began at the east end of the job. This represented the longest haul. Consequently, about 24 dump trucks were used here. Paving was finished the day this article was written, and the number had dwindled to 5 as the machines got closer and closer to the hot-mix plant.

Because of the cold winter weather and the length of haul, tarpaulins covered the loads through most of the job. The truck bodies were also oiled with diesel fuel when necessary. Body oil and the tarps were placed by the truck drivers.

As each truck arrived out on the job where pavement was being laid, it dumped its load to the receiving skip of a Barber-Greene Tamping-Leveling Finisher. For the first strip of a course the Barber-Greene machine worked to a string line, while the second strip was placed by crowding the first slightly. This practice helped to eliminate the longitudinal center joint between strips.

The first 2-inch course was laid 23 feet wide in two strips, with the top two courses gradually narrowed down to make a finished paving width of 22 feet. The first two courses had just enough coarse aggregate to roll down beautifully, while the top course was made of finer material.

Under the paving foreman were an operator and screed man on the Barber-Greene machine, 2 power-roller operators, 2 rakers, and 3 laborers. Very little raking was necessary, because the Barber-Greene laydown machine distributed and partly compacted the material as it crawled along.

The pavement was given a breakdown rolling quite soon behind the laydown machine by an 8-ton Buffalo-Springfield tandem roller; special emphasis was placed on the center joint. Later rolling was the responsibility of a 6.75-ton Buffalo-Springfield machine of similar design. Most of the rolling was longitudinal. In just a few places, where the fine top mix tried to wave, experienced old heads on the job gave it some diagonal rolling and that straightened everything out. The finished surface was smooth-riding and safe.

Shoulder Work

After the pavement was down, shoulder work followed very closely behind, often within ¾ mile. Shoulders were built up by trucking in a select sandy material, dumping the loads in place, and blading the material with a Caterpillar No. 12 motor grader. These shoulders were then rolled by rubber-tire rollers to get the necessary compaction. A 1-inch course of crushed rock completed the shouldering operation.

The red, clayey backslopes will soon be seeded by Oklahoma maintenance men, because Oklahoma has recognized the importance of tying down the topsoil before it can wash down in the drain ditches. Red though this soil is, it contains enough plant food to start and sustain several varieties of low-growing grasses such as Bermuda.

All in all, it was a tough winter job for the contractor and his men, but it was completed just in time to put this crew in a fine position to start spring work on 5 more miles which they now have under contract. Additional future lettings were coming up, too, and the boys had the usual high hopes of a good season. "No job could be as tough

(*Concluded on next page*)

C. & E. M. Photo

As paving draws towards a finish on the Oklahoma job, a final estimate is discussed. Those participating are, left to right, General Foreman Pybas, Paving Foreman Zur Schmiede, Paving Inspector J. E. Collins, and Resident Engineer Bumpass.

The JIFFY Stake Puller

Different! —Works like a pump!

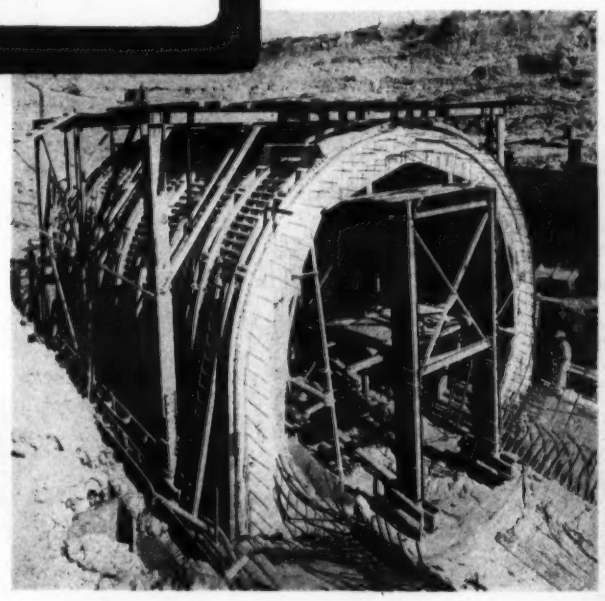
No more bending down to attach jaws to the pin by hand. . . . Attach by the handle . . . then an easy push downward lifts out the pin. Easy to operate. Pays for itself in a week. You get your forms ahead faster for resetting.

With a JIFFY Stake Puller you can drive pins flush with the top of your forms. This means better "strike-off" work and insures the best of concrete.

TIGERMAN ENGINEERING
627 N. Silver Spring Rd. Milwaukee 11, Wis.

Job tough! Problems unusual!

28'0 Diameter COLLAPSIBLE TUNNEL FORMS being used on PASADENA TUNNEL



Forms and form technique by

CONCRETE FORMS CORP.

In the construction of the Pasadena Vehicular Tunnel in Pasadena, Texas, treacherous ground at the bottom of an 110-foot deep excavation caused difficulties solved by pouring the complete shell for the land tunnel in the first pour. Forms and form techniques were supplied by Concrete Forms Corporation.

Steel shells of the underwater tubes and special 40-foot traveler forms were specially designed for the purpose by Concrete Forms Corp.

In the underwater sections provision for quick assembly and knock-down was needed since the parts had to be shifted from one of the 375′ tubes to the next one through a six by four-foot opening. Concrete Forms solved the problem.

To those interested in the details of this tunnel, we will gladly send a reprint of an article on the subject. Just ask for it.

STATISTICS OF PASADENA TUNNEL

1500 feet underwater, 2236 feet under land—Excavation 110 feet deep—Inside diameter of tunnel 28′—Underwater tunnel sections 375′ long—Waterstop shell, 32′ diameter—Shells for underwater section floated 400 miles to site.

Whether you plan to go through mountains, tunnel underwater or just pour a foundation for a small warehouse, if there is any special problem, consult Concrete Forms Corp.

We have solved so many problems for contractors and builders that we can help you use a sharper pencil on your estimates. Please write without hesitation for any advice or information. Today's a good time!

"CREDIT LINES"
PASADENA VEHICULAR TUNNEL
PASADENA, TEXAS
For Harris County, Texas
ARCHITECTS & ENGINEERS
Palmer & Baker
GENERAL CONTRACTOR
Merrit, Chapman & Scott
LAND SECTIONS BY
R. P. Farnsworth & Co., Inc.
STEEL FORMS FOR LAND & WATER SECTION
Concrete Forms Corporation
Irvington, New York

CFC
CONCRETE FORMS CORPORATION

as the one we just finished," one operator put it.

Personnel

Both contracting partners of the Ryan-Richards organization were active supervisors in the field, assisted by General Foreman J. R. Pybas, Paving Foreman N. C. Zur Schmiede, and Plant Foreman H. B. Johnson.

The job was designed under the general supervision of Stoner K. McLelland, Chief Engineer, with J. J. Stobaugh, Jr., as Construction Engineer. Resident Engineer for the State was T. S. Bumpass.

The big painted "Sign of Progress" at each end of the job while it was under construction is now a reality to those who will use Oklahoma 33 east of Kingfisher.

Tunnel 30 Miles Long Contemplated in West

Construction of the world's longest tunnel is being considered by the Department of the Interior as part of the 192,000-acre Payette Unit of the Mountain Home Irrigation Project near Boise. The tunnel would be 30 miles long and 19 feet in diameter. It would pass through several mountain ridges, and at one point would be 2,400 feet below the earth's surface.

According to the Bureau of Reclamation engineers, this tunnel would exceed in length such major tunnels as the Delaware Aqueduct which feeds the city of New York, the 24-mile Hetch-Hetchy water-supply tunnel of the city of San Francisco, and the vehicular tunnels driven through the Swiss Alps.

The tunnel would be horseshoe-shaped, lined with 18 inches of concrete, and would run from the upstream end of Garden Valley, near Banks, Idaho, to Moores Creek in the Boise River basin. It would have a fall of 137 feet, or 4½ feet to the mile, and a maximum capacity of 2,700 cubic feet per second. The water would have a velocity under free-flow conditions of 10 cubic feet per second; however, a pressure tunnel is also considered.

An estimated 6 to 8 years would be required to complete the structure, with an estimated 1,000 to 1,500 men employed at the height of the construction. Shafts 20 feet in diameter would be built along the route of the tunnel to provide ready access for workmen, for removing rock blasted loose, for ventilation, and to permit work to be carried forward simultaneously in several areas. Some of these shafts would be as much as 1,150 feet deep.

The Bureau's engineers feel that the tunnel plan would reduce operation and maintenance costs, permit fuller utilization of waste waters of the Payette River, and make available about 75,000 kw of additional installed power capacity.

Actual construction will depend on whether the project is found to be economically feasible.

Heavy-Duty Grader In the 100-Hp Class

Having successfully completed a series of road tests, the new Warco 4D-100 extra-heavy-duty motor grader is now being delivered, according to an announcement by the W. A. Riddell Corp., Bucyrus, Ohio. It is the first built by Riddell in the 100-hp class. Ditching, backfilling, bank sloping, scarifying, applying black-top, and fine-grading were typical assignments during the tests.

On-the-job advantages claimed for the new Warco include: full 360-degree revolving of the circle without removing the scarifier or teeth; minimum operator fatigue because of hydraulic control; unusual blade reach; and exceptional clearances under the front axle and transmission.

The first motor grader to be built by Riddell in the 100-hp class, the new Warco 4D-100, has completed its road tests and is now being delivered.

The new model is the latest in the Riddell series of hydraulically controlled graders, the first of which was built in 1926 and was just recently retired from service.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 76.

Represents Lubricant Co.

The D-A Lubricant Co., Inc., Indianapolis, has added another sales and service representative to its southern Illinois territory in the appointment of Warren Earl Moore. Mr. Moore is well known in the heavy-duty equipment fields throughout southern Illinois and eastern Mississippi. His specialized experience has been in the engineering of diesel and electric power units and installations of power transmission equipment.

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Sorts Sand, Gravel As It Digs and Loads

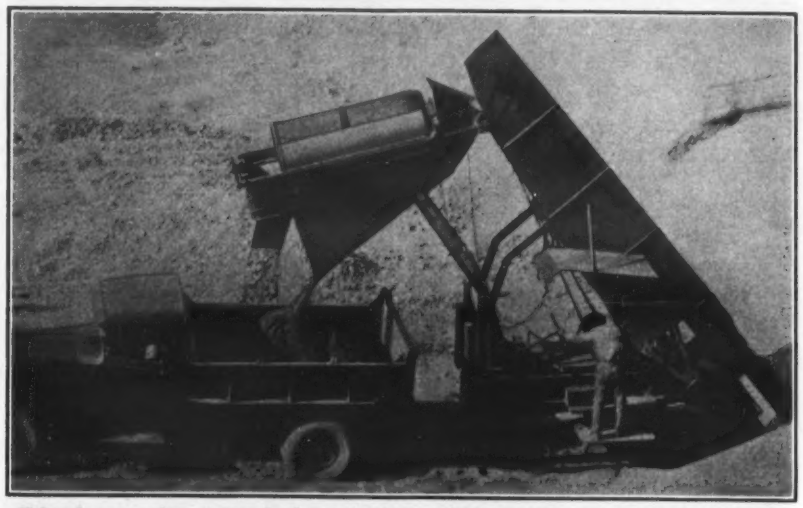
A rotary-screen loader designed to separate sand and gravel as it digs and loads is announced by the N. P. Nelson Iron Works, Clifton, N. J. This one-man-operated unit consists of a Nelson rotary screen mounted on a self-powered Nelson Model Q-10 heavy-duty bucket loader. In operation, the screen is synchronized with the bucket conveyor of the loader, the manufacturer explains.

The unit has two chutes at right angles which direct the flow of separated materials. When it is digging and loading materials that do not require screening, its throw-out clutch enables the operator to disengage the screen and deflect material through the lower chute. The rotary screen is said to handle damp and clinging sand. Screening capacity of dry mixtures ranges from 1 to 2 cubic yards a minute, depending on the size of the screen openings and the mixture of the material.

The bucket loader features the Nelson steel-toothed feeder which picks before it shovels, dislodging material and spiraling it into the buckets so that there is no need to shovel or loosen the bank. The screen is 3 feet 4 inches in diameter and 4 feet 10 inches in length. Standard screen-opening sizes are ½, ¾, and 1-inch square, with special sizes and construction available.

The manufacturer points out that this one-man production plant is entirely self-contained, can be moved and positioned quickly, and serves as an economical means of developing mixed sand and gravel pits of all sizes. The weight of the screen assembly is approximately 1,800 pounds. The weight of the loader on which it is mounted is approximately 14,500 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 6.



Nelson's new rotary-screen loader separates sand and gravel as it digs and loads into trucks. In operation, the screen is synchronized with the bucket conveyor of the Model Q-10 loader in which it is mounted.

Consultant on Gears

F. H. Boor, for more than 20 years Chief Engineer of the Fairfield Mfg. Co., a gear manufacturer in Lafayette, Ind., has resigned from that company and established a consulting and research service on gear design and application. He has had a broad experience in the design, manufacture, and application of spur, helical, straight-bevel, spiral-bevel, hypoid, Zerol, worm, and differential gearing for automotive, construction, and industrial equipment.

Mr. Boor is a graduate of the Mechanical Engineering School, Purdue University, and a registered professional engineer. He holds several patents covering special tooth forms and gear cutters. Recently he has been engaged in research projects jointly with the Engineering Mechanics Department of Purdue University. He is located at 927 Highland Ave., Lafayette, Ind.

Power Chain Saws Covered

The Warren high-speed chain is stressed in a folder on power chain saws put out by Lombard Governor Corp., Ashland, Mass. The chain cuts faster with its plow-shaped steel teeth, explains the bulletin, and uses less motive power.

Three types of Lombard saws—all of them feature the Warren chain—are pictured and described in the bulletin: a gasoline-powered model in 24, 36, and 48-inch lengths; an electric-powered model in the same sizes; and a lightweight pneumatic power chain saw 24 inches long.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 80.

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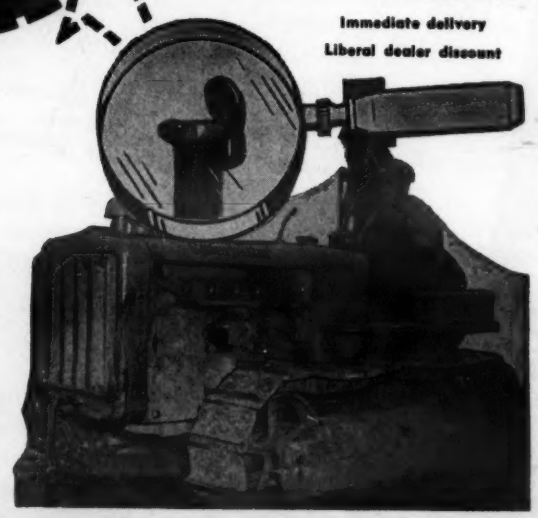

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What Makes a Good Engineering Trainee?

When Construction Firms And Highway Departments Choose Trainees, What Should They Look For?

By ROBERT N. McMURRY, Ph.D.

✦ CONSTRUCTION firms and highway departments are confronted constantly with the problem of choosing capable college people who can be trained for responsible jobs in the office and in the field. Moreover, every choice that turns out to be wrong is also costly.

In a study involving 1,167 college trainees chosen by 247 companies of all varieties over a period of 13 years, only 58 per cent of the college men were adjudged able and suitable after a year or more of training. The 42 per cent failure cost money, for the median value of training was placed at $2,750 for each trainee during the first year. And it cost time and effort: with one year wasted, the task of refilling the ranks still remained.

Inadequate Bases for Choice

The reason for this failure becomes obvious when one examines the grounds on which junior engineers, for example, are usually chosen—(1) appearance, (2) academic achievement, and (3) high intelligence quotient.

Recruiters or interviewers—like almost all of us—are unduly impressed by appearance. When they seek engineering or executive personnel, for example, they often grope for the tall, manly type—the chap who will inspire confidence by his forthrightness, by his poise, his dignity, and his personality. The Italian psychologist Lombroso made this error in reverse when he held that criminals have certain physical characteristics in common—ears of certain dimensions, low foreheads, heavy jaws, thick fingers, etc. The theory has long since been exploded, of course.

Actually, there is no "executive type", "engineering type", "scientific type", or even "bookkeeper type". Only in the movies do we find such casting successful. In real life, a stooped and mumbling individual with a bald pate—one who looks like a hen-pecked husband by Hollywood standards—may turn out to be an aggressive, crack construction supervisor. Unless interviewers are sharply on guard against this tendency to seek "types", they may often be led astray.

The interviewer must also guard against choosing men whose appearance appeals to him *personally*. Otherwise his own bias for or against red hair, let us say, or blue eyes, or hairless hands, or conservative clothes, may determine the selection or rejection of a trainee. These personal biases are hardest of all to eradicate.

Academic achievement is, of course, desirable in engineers, but it is not necessarily a sign of the ability to work face-to-face with other people in ordinary construction situations. Then too, some men find college work so easy that they never develop strong habits of industriousness. As a result, when confronted with the problems of practical construction and with the pressure of time schedules usual in the field, they become bewildered and lost. They take refuge in shifting responsibilities and avoiding decisions.

As for a high I.Q.—this is helpful, but to what extent? Junior engineers with extremely high I.Q.'s are occasionally recruited for jobs which require only an average intelligence. And they do not usually employ their margin of intelligence, so to speak, in doing the job better, since it so often must follow a pattern laid out by the senior engineers. The result in some cases is that the young man with the high I.Q. soon gets bored with his job and irritable with the people about him.

A recent case illustrates the point. The young man in question, recruited into a construction firm of national scope, was told to make cost estimates. Now cost estimates are complicated, but not complicated enough to employ the high I.Q. of this trainee. At the end of three months, he was quarreling daily with the senior engineer. He soon left the firm for another one where he was given freer rein in making cost estimates, figuring material uses, scheduling machinery, etc.—in other words, where his high level of intelligence was put to better use.

High I.Q.'s are worthy of respect, but the important point is that a junior engineer's intelligence must be geared to the job, to the personnel, and to the clients involved. An Albert Einstein would probably fail as a junior engineer but do well in certain intricate phases of the construction business.

More Reliable Bases for Choice

If academic achievement, high I.Q., and good personal appearance are not the soundest criteria for choosing junior engineers, what are more reliable criteria? The previously mentioned study of 1,167 college trainees over a 13-year period has convinced a good many executives that there is no short cut to personnel selection—any more than there is a short cut to choosing a wife.

What are the traits which trainees in the construction industry *ought* to have, and how do you determine them? The study indicates that seven major factors—in addition to technical competence—are involved in successful performance.

1. Occupational Stability

It is important that men be hired

(*Continued on next page*)

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What Makes a Good Engineering Trainee?

(*Continued from preceding page*)

who will stay with the firm long enough to bring in a return for the money invested in training them; and, more than that, advance to senior, supervisory, and perhaps major executive positions.

Some college men have strong but transient enthusiasms for different fields. One good student tried statistics for one year, business law another year, physics a third year, and finally finished up as a major in engineering, with a good record of grades. Because of his mathematical talents, he was chosen by a recruiter to work in the estimating department of a construction company.

However, his basic instability soon showed itself in passing enthusiasms for different aspects of his job. Tasks energetically begun fell by the wayside, unfinished or finished to the chief engineer's dissatisfaction. The trainee would overlook important instructions, or forget to relay vital information to the chief's office. His interests ran off in all directions because he was basically unsettled, always seeking to try something else, and always only momentarily enthusiastic. There was no occupational stability there, no habit of staying at one activity for an extended period of time.

2. Industry, Desire to Achieve

Every man, when asked directly if he is industrious, energetic, desirous of achievement, will promptly reply in the affirmative. Yet as everyday evidence indicates, not every young man will labor steadily, conscientiously, and productively on his assigned tasks and duties.

The intelligent engineering student who finds school work easy, who has never had to earn any of his own spending money, who has had his way through school paid by others, who has idled his summers away at resorts or in purely pleasurable activities, has probably never developed the habit of working hard.

The industrious man, however, is uncomfortable—and may make others uncomfortable—if he is required to remain idle. He is usually motivated by a desire to achieve, and he expresses that desire mainly in a drive to work at constructive tasks.

There are exceptions, though. One able supervisory trainee, regarded as a rare find by a recruiter, soon made it clear that his "industriousness" was not motivated by a desire to achieve so much as by a desire to be important. After some training, he was placed in charge of a small part of a large road project. As the novelty of his job wore off, his work became slipshod and he attempted short cuts which resulted in work having to be done over at the contractor's expense. He often left his section of the job and visited others, giving freely of advice on how other jobs should be done. He let it be known that he was there merely for a short time and would soon be assistant to the project manager. His work, however, sank to such a poor level that the company was forced to let him go after a few months.

3. Follow-Through

The ability to persist in an activity despite difficulties and obstacles, and to finish what has been started, is a desirable characteristic in trainees. Many of them become discouraged too easily when confronted with complicated procedures involved in securing materials and parts, in assembling figures from several different supervisors, in working out construction schedules, in dovetailing the work of several crews, etc. Sometimes even getting a crew to work smoothly at a concrete batching and mixing plant on a project seems like an overwhelming task to some trainees.

All these are tough assignments for junior engineers, and they require perseverance. But the interest of some men dwindles as complications develop; they pursue the problem only half-heartedly, and then seek ways of dropping it.

This sort of man is usually the product of a home in which he was rarely reprimanded for failure to do his best or even to come up to standard. If his spelling was worse than that of his classmates, the excuse was that the teacher favored other children. If he took music lessons, he was rarely required to knuckle down and practice regularly. No desire to complete a task was ever inculcated in the child, with the result that the adult lacks the desire also.

"Somebody told them factories have lounges—so it was that or no highway."

(*Continued on next page*)

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4. Non-Egocentric Goals

Almost every business demands that its employees put the company's interest before their own, and, on occasion, go beyond the ordinary requirements of their jobs and put in a few extra licks for the company. Yet this ability to think in terms of company welfare and company goals is by no means characteristic of everyone.

Young men who have led sheltered lives as only children, youngest children, or sickly children, for example—who have been protected by over-zealous parents—very often become demanding adults and continue to expect others to do for them. They have no drive towards doing for or contributing to others. Company or team loyalty is a concept they cannot grasp, since they habitually look out for themselves first.

Such a person tends to have little regard for a firm's good will or assets. He is apt to sneer at fellow workers who stay overtime to finish some assigned task, and he often takes short cuts harmful to company policy and procedure. He will probably resent anyone else's promotion, refer to him as "the chief engineer's pet" or worse, and generally speak critically of company plans. He may also slyly try to get a "kickback" from a material supplier.

5. Self-Reliance

A degree of self-reliance and the ability to make decisions is needed in every job. Junior engineers are often called upon to make minor decisions, either in their own work, or when their supervisors are away or otherwise not available. If they are going to succeed, they must acquire ease in making more decisions involving matters of increasingly greater complexity and affecting more people.

However, some men never learn to make decisions because they are basically afraid of responsibility. They avoid decisions whenever possible, and ask supervisors what to do even in the most obvious situations.

As a rule, such an individual works on the problem which requires the least direct responsibility and self-reliance. He will blunder badly when confronted with an important decision, as in the case of a trainee who had to decide what to do with some excess road machinery. Having no one "to lean on" at the moment, he ordered some of the machinery shipped to other jobs, without regard for the fact that the other jobs could not use that particular type of machinery. The cost of returning and re-routing the equipment was considerable.

In another instance, a civil-engineering trainee worked well for a time, but it became increasingly evident that he had difficulty in making the necessary decisions and completing his assignments on the project without undue consultation with his supervisor. He began to feel that the senior was letting him down, giving him more responsibility than one man could assume, and making his job more difficult for him.

An interview disclosed that the trainee was the youngest of three children, and the only boy. He was idolized by his sisters. His father, a graduate civil engineer, had induced the boy to study civil engineering; in fact, he had carefully chosen the subjects the boy took every year, and joined in on every decision the boy had to make. The boy never outgrew that support, and in industry could only produce when he had a benevolent supervisor. He would take no steps on his own. After three months with the firm, he left of his own accord, telling the chief engineer that he was being given more work than other juniors, and was expected to turn it out "single-handed."

6. Social Elasticity

The ability to make and hold friends, to maintain good working relationships with others, and to obtain good personal acceptance by others, is extremely important in jobs which require face-to-face contacts. In good part, this is also the ability to accept criticism and differences of opinion.

Occasionally, a junior engineer will turn out to be a sharply competitive, uncomfortably critical person, who regards all his associates and seniors as rivals, and who unnecessarily criticizes their conduct and work. Such an individual turns bitter if his judgements and suggestions are not wholly and completely accepted. While he may have an excellent intelligence and good judgement, his conduct is most often keyed to forcing others to cooperate with him rather than meeting other men halfway. When his aggressive tactics arouse reactions, he endeavors to label other people as uncooperative. Should his opinions be by-passed, he will sulk and pout and criticize the work of associates. The inevitable result of such behavior, if prolonged, is a construction firm broken up into cliques, with men pulling against each other.

One college engineering trainee — a tall, manly-looking fellow with a fine achievement record at school—hit it off well when he started with an eastern firm, and was soon invited to sit in on the noon rummy games. However, his gloating over his winning and his bitter resentment over losing soon rubbed co-workers the wrong way. At the same time, he remained very affable with his seniors and supervisors, and often, in a "you-should-know-about-this" approach to the chief engineer, he would

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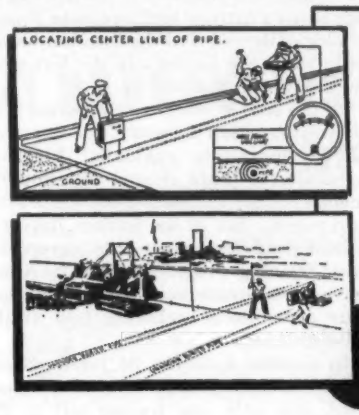

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What Makes a Good Engineering Trainee?

(*Continued from preceding page*)

reveal some minor failure on the part of one or the other of his fellow engineering trainees.

However, a few serious mistakes he made on estimates first caused his chief engineer to become aware that something was amiss. Called on the carpet for an explanation, the trainee heaped abuse on other junior engineers, finally demanding that so-and-so be transferred to other work for "criticizing all my ideas and methods". On subsequent occasions, he complained of "lack of cooperation" from other supervisory personnel. After eleven months, he left.

7. Leadership Without Belligerence

Junior engineers come in at the bottom of the ladder, and are not expected to start out in positions of leadership. Nonetheless, a junior who does not possess certain basic traits will not develop into an able senior engineer, nor will he inspire confidence in juniors or in outside contracting companies, even after years of experience.

It is important that a junior want to be a leader. Quite often, men unconsciously desire to accept instructions and follow directions rather than to lead people. Some of them are frightened by responsibilities and unconsciously avoid administrative burdens.

On the other hand, there are men who enjoy being seniors, supervisors, and even firm partners—not primarily because of the power which it permits them to exercise, but because of the wider achievement it permits them to gain. Such men are usually considerate of the feelings of their subordinates, their status, desires, etc., and gain their cooperation by inspiring confidence and admiration.

A common sight, however, is a senior engineer or supervisor who regards his subordinates as hired hands. Since his own desires are uppermost, he sees no reason for being polite or considerate with those beneath him. He is apt to be arrogant and harsh, arbitrary in his demands, and capricious in his instructions. He is in no sense a "leader", and the dissatisfaction and turnover among those he bosses are therefore high.

Juniors who are apt to develop into such "leaders" are usually indifferent to those around them. They want to get ahead so fast that they will step on everyone in the organization in the process. They arouse antagonism in others on their level, and resentment in people beneath them.

Such junior engineers are often able people, as far as the ability to organize materials is concerned. But in the area or organizing men, they are totally deficient. They have no ability to put themselves in the other fellow's shoes, and will bull through a decision no matter what black hatreds are aroused.

Emotional Maturity the Key

These seven character traits are really part of a deeper and wider personality structure. In essence, anyone who has these desirable traits is emotionally mature, no matter how young he may be in years. Absence of these traits indicates some degree of emotional immaturity, regardless of grey hair.

In choosing junior engineers, then, as well as other personnel, we need to evaluate the degree of emotional maturity they have achieved in relation to the particular job involved. Immature people are not strangers to us. Well over half the population is immature in some area of behavior. Some of the exhibitionists, for example, have capitalized on their immaturity, and we enjoy their dramatic work. On the other hand, an engineer's job calls for no such display of exhibitionism, nor is a bulldozer safe in the hands of a day-dreamer.

The answer to the problem of how to choose good junior engineers is twofold: (1) know clearly the technical and psychological qualifications for the job, and (2) use a fixed "pattern" interview which permits the interviewer to explore all facets of the applicant's background. The pattern interview (there are several varieties, all good) is fairly easy to learn. And once used, it enables an interviewer to lay out an applicant's history and evaluate it psychologically—so that the firm knows not only what the junior *can do*, but what he *will do* on the job.

In the case of one firm connected with the construction industry, for example, of 29 applicants evaluated by such methods, 10 were chosen for employment. All are still employed there after two years. Six of the juniors have received promotion since they completed their training program—three have received two promotions, and one has had four promotions including two at the executive level.

In another instance, 34 juniors were taken on after pattern interviews were used, and only one trainee left in the period from July, 1946, through October, 1948. The one trainee who left did so to enter a family business.

The problem of junior engineers might not be so serious were it not for the fact that most top engineers of the next generation are expected to come from the ranks of present-day juniors. Where they are well chosen, realistically evaluated by pattern interviews, they are a great asset to their firms. Where they are badly chosen, however, as seems to be the case too often today, they mess up their own jobs, disrupt the work and morale of other employees, and dissipate company assets and good will.

Traffic-Flow Signals For Use on the Job

Portable traffic lights for guiding cars and trucks through zones where construction or maintenance operations are under way are manufactured by Southern Signals, Inc., 222 Beech St., Shreveport, La. The company reports that it can provide complete traffic systems which one man can operate. They are designed for either 110-volt ac or 6-volt dc power supplies, are portable and flexible to meet each job's requirements.

The Southern signals have a cast-aluminum-alloy housing, a lens and holder which meet specifications of the Institute of Traffic Engineers and the AASHO, a precision-spun parabolic-shaped Alzak reflector, a sheet-aluminum sun visor about 1/16 inch thick, a vibration-proof lamp receptacle, and heavy-duty wiring and mounting.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 32.

Loader Is Truck-Mounted

A self-fed self-propelled truck-mounted materials loader is described in a catalog issued by the Pettibone Mulliken Corp., 4710 W. Division St., Chicago 51, Ill. The PMCO Speed Loader is designed for a five-fold purpose; to pick up windrowed material, to load from stockpiles, to dig shallow trenches, to level, and to be used with road-mixes.

Bulletin SPL contains twenty pictures illustrating features of the Speed Loader and some of its typical applications. A large 2-page line drawing shows its general construction features.

Specifications listed in Bulletin SPL cover the transmission unit, the feeder, controls, loading capacity, speeds, self-feeding mechanism, the conveyor assembly, chassis assembly, the power unit, buckets, scraper blade, conveyor belts, clearances, dimensions, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 85.

RUD-O-MATIC
MAGNET REEL-TAGLINE COMBINATION

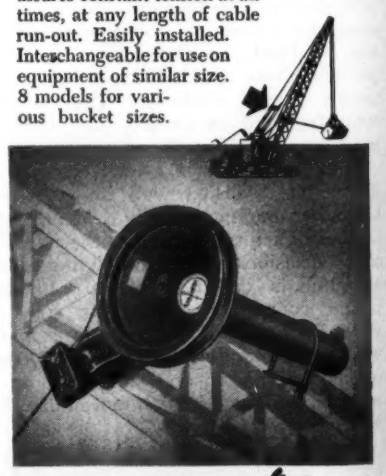
Rud-o-Matic Combination Magnet Reel-Tagline saves costly electric cable on overhead and boom crane magnet pick-up jobs. Steel tagline cable takes the load. Protective slack is maintained on electric cable. Models to fit your need.

Boom Crane or Overhead Crane Clam Shell Bucket or Magnet Pick-Up

RUD-O-MATIC TAGLINE CONTROL is your answer!

RUD-O-MATIC TAGLINE

holds the bucket steady at any angle of the boom. Heavy duty torsion coil spring assures constant tension at all times, at any length of cable run-out. Easily installed. Interchangeable for use on equipment of similar size. 8 models for various bucket sizes.



McCAFFREY-RUDDOCK Tagline CORP.
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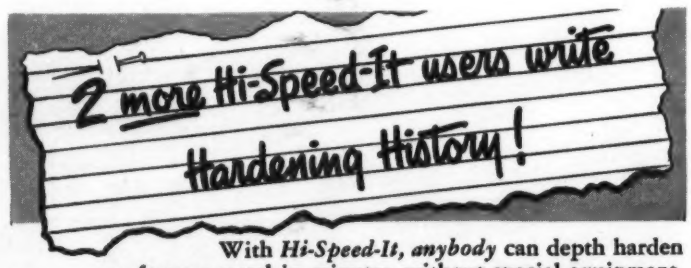

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Mail coupon for trial supply or for more complete information. Your money will be refunded if *Hi-Speed-It* fails to do everything we claim.

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Send (state quantities) ☐ 2-lb. ☐ 5-lb. ☐ 10-lb. cans of *Hi-Speed-It* at $14 per lb., F.O.B. New York. (Also available in 25-lb. cans and 100-lb. drums with special discounts for 200 lb. or more.) Send more information on *Hi-Speed-It*. ☐

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We carry largest stock in midwest. All makes and models. LOWEST PRICES. *Write stating model to*

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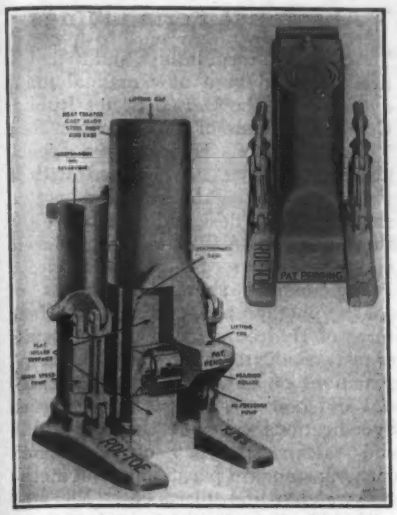

The Rol-Toe hydraulic jack features the same 25-ton lifting capacity at the toe as at the cap. The ram is stationary and is part of the base of the jack. The body of the jack is the moving part and performs the lift.

Hydraulic Jack Uses New Lifting Design

A heavy-duty hydraulic jack is announced by the Wm. S. Pine Co., 1635 E. 22nd St., Los Angeles 11, Calif. The Rol-Toe jack has a 25-ton capacity and is said to embody a special principle for increasing the lifting capacity at the toe. The ram is stationary and is part of the base of the jack. The body of the jack is the moving part and performs the lift.

When lifting by the toe, the lateral or off-set stress is carried on the steel roller which moves along the flat, milled surface of the stationary ram. The result is that the Rol-Toe jack has the same lifting capacity at the toe that it has at the cap, the manufacturer explains. It is provided with two hydraulic pumps —one for high speed, and the other for heavy duty. The fact that the oil reservoir is separate from the hydraulic cylinder, so that no pressure is imposed on the reservoir, eliminates a frequent cause of leakage. The company points out that the Rol-Toe jack can be used in either the horizontal or perpendicular position.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 64.

Building Paper Comes In Extra-Wide Rolls

Building paper in 10-foot-wide rolls is available from The Richkraft Co., Builders Bldg., Chicago 1, Ill. Its extra width is designed to eliminate the expense of overlapping narrow rolls, and to provide ease and speed in handling and storage operations. The rolls of Skufpruf Ten are 100 feet long and weigh 60 pounds. The paper is also available in 3, 4, 5, 6, and 7-foot-wide rolls.

Richkraft Skufpruf has a high wet strength and resistance to shrinkage, scuffing, and abrasion, the manufacturer points out. It is designed for curing and protecting concrete slabs of all types: over-sheathing in frame, veneer, and stucco side walls; serving as a moisture-vapor barrier or a roofing dry-sheet; covering equipment and materials; and lining contractors' shanties.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 42.

Catalog on Clutches

A 16-page two-color catalog on the Morse-Formsprag full-complement over-running clutch—its construction, development, and working principle—can be secured from the Morse Chain Co., Dept. 22, 7601 Central Ave., Detroit 8, Mich. Morse-Formsprag clutches are available in all-purpose, indexing, and plain-bearing types. They are made in a wide variety of horsepower and torque capacity ratings, with a choice of standard bore diameters.

Catalog C11-48 gives engineering diagrams of special designs at work, with the Morse-Formsprag clutch integrated within the designs. Morse-Formsprag applications include jet aircraft engines, generators, blower fans, and many other versatile drive mechanisms.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 83.

Carey Holds an Election

John W. Humphrey has been elected President of the Philip Carey Mfg. Co. He succeeds Robert S. King, who became Chairman of the Board, succeeding George A. Rentschler who continues as Chairman of Carey's Executive Committee. L. W. Clarke, formerly General Sales Manager, has been elected Vice President in Charge of Sales, following the resignation of E. W. Smith.

Line of Hose Accessories

Hose couplings and clamps, air valves, and air manifolds are listed in a condensed catalog, No. 149, issued by the Hose Accessories Co., 17th and Lehigh, Philadelphia 32, Pa.

LE-HI equipment described in the catalog is classified under these major headings: suction or water-hose couplings; combination male hose nipples; brass long-shank hose couplings; single-bolt hose clamps; double-bolt hose clamps; universal-type hose couplings and safety-locking types; universal-type hose clamps; high-pressure hose couplings; high-pressure hose couplings and nipples; throttle valves; air-hammer hose couplings; and manifolds.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 90.

Let HYDRAULICS lift your equipment

use the **MONARCH**

HY-LO-JACK FAN BELT DRIVEN

POWER HYDRAULIC CONTROL

Lifts equipment ten times faster than hand pump. Easy installation on new or existing equipment. Hundreds of applications, such as Snow Plows, Sweepers, Power Mowers, etc. Priced for the most conservative budget.

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MONARCH ROAD MACHINERY COMPANY, 327-329 Front Ave., N. W., Grand Rapids 4, Michigan

America Wants Value . . . America Buys

CHEVROLET ADVANCE-DESIGN TRUCKS

America's truck operators know that these all-star cargo carriers deliver the goods all along the line—in power, stability, stamina, handling ease, comfort and convenience. They know—and they buy and operate more Chevrolet trucks than any other make. And in owning the nation's Number 1 truck, they enjoy *lower cost* of operation, *lower cost* of upkeep and the *lowest list prices in the entire truck field!*

Chevrolet's the *Only* Truck With All These Features

NEW CHEVROLET 4-SPEED SYNCHRO-MESH TRUCK TRANSMISSION

A special feature in Series 3800 and heavier duty models that assures new operating ease and efficiency.

THE CAB THAT "BREATHES"

Here are the trucks with the famous cab that "breathes"! Outside air is drawn in and used air is forced out! Heated in cold weather.*

FLEXI-MOUNTED CAB

Chevrolet's Advance-Design Cab is mounted on rubber, cushioned against road shocks, torsion and vibration.

IMPROVED VALVE-IN-HEAD ENGINE

The world's most economical engine for its size now has greater durability and operating efficiency.

SPLINED REAR AXLE HUB CONNECTION

Greater strength and durability in heavy-duty models with this exclusive Advance-Design feature.

PLUS Uniweld, all-steel cab construction • New, heavier springs • Full-floating hypoid rear axles on the 3600 Series and heavier duty models • All-round visibility with rear corner windows* • Specially designed brakes • Hydrovac power brakes on Series 5000 and 6000 models • Ball-bearing steering • Double-line pre-selective power shift in 2-speed axle at extra cost on Series 5000 and 6000 models • Wide-base wheels • Standard cab-to-axle-length dimensions • Multiple color options.

*Heating and ventilating system and rear corner windows with de luxe equipment optional at extra cost.

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

CHOOSE CHEVROLET TRUCKS FOR TRANSPORTATION UNLIMITED!

Tandem-Axle Truck Has 34-Ton Capacity

A new-model rear-dump unit is announced by The Euclid Road Machinery Co., Chardon Road, Cleveland 17, Ohio. It has a payload capacity of 34 tons or 20 cubic yards struck. The Model FFD is powered by two GM diesels mounted side by side, each with a rating of 190 hp to provide a total of 380. Each engine drives one of the rear axles through a torque converter and a Torqmatic transmission.

The manufacturer reports that there is no clutch pedal or manual shifting of gears, and that the operator can change to the proper gear ratio under full power at any travel speed. Top speed with a full load is 25.4 mph. Total braking surface is 1,620 square inches. Two planetary drive axles are mounted on free-floating springs. Reductions are provided at each wheel. Improved steering and a hydraulic booster are said to make the FFD exceptionally maneuverable.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 11.

Capacity of the new tandem-axle end-dump Euclid Model FFD is 34 tons or 20 cubic yards struck. The unit has no clutch pedal and does not require manual gear shifting.

Ducts in Concrete Are Formed by Tubing

A pneumatic rubber tubing for molding ducts in concrete and other mastics is available from the Ductube Co., 940 Shoreham Bldg., Washington, D. C. According to the manufacturer, this material can be used to mold all types of ducts, either straight or curved. In operation, the Ductube is inflated by means of an air pump or air compressor; it is put in place; concrete is poured in the usual way; and the Ductube is deflated and removed after the concrete has set.

Ductube is available in standard lengths of 10, 20, 30, or 40 feet, and in standard sizes for molding ducts of 1, 1½, 2, or 3 inches in diameter. Special lengths and sizes are supplied to order. The tubes can be joined together for extra-long runs. Some typical uses of Ductube are for molding ducts for wiring or other utilities, for underground drains or concrete conduit, for grout holes, for floor drains, and for heating systems.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 77.

High-Additive Oil

A new type of additive crankcase lubricant has been developed by The Warren Refining & Chemical Co., Lubrication Division, 750 Prospect Ave., Cleveland 15, Ohio. The Bustrux X.H.D. motor oil is designed for both light and heavy-duty automotive equipment, the company reports. The high amount of additive it contains slows the additive depletion rate, says the company, and provides a greater resistance to corrosion.

The Bustrux X.H.D. oil is recommended by Warren for use under varying load conditions which, along with high-sulfur-content fuels, cause contamination by developing unburned fuel, soot, sludge, and varnish. Warren reports that its new motor oil will improve engine performance under these conditions. The oil is at present available in the SAE 30 grade.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 38.

Aggregate Wire Screens

Aggregate wire screens in four styles are described in a catalog issued by the Woven Wire Fabrics Division of John A. Roebling's Sons Co., Roebling, N. J. These include the Roeflat screens which feature a flat surface designed to permit slow and even diffusion of wear; the Roeton which is recommended by the company for high-volume high-production screening operations; the long-slot long-life Roeslot which has a maximum open area to permit a high rate of production and minimum of blending; and the Roebling double-crimp screens which are furnished with smaller openings in square mesh to meet exacting requirements and close tolerances in screened material.

The catalog lists the spacing of the wires for each of the types of screens, the diameter of the wires in inches, percentage of open area, and weight per square foot. It lists recommended square openings to replace round perforations and produce the same size of material, it tabulates wire sizes in decimals of an inch and gage of wire, and it describes seven types of edge preparations.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 14.

Concrete-Surfacing Tools

Equipment for surfacing and finishing concrete is described in a bulletin issued by The Concrete Surfacing Machinery Co., 4665 Spring Grove Ave., Cincinnati 32, Ohio. Equipment listed in the bulletin includes 2 types of Hi-Way surfacers, 6 types of portable hand surfacers, 4 styles of heads for use with the hand surfacers, and 2 styles of concrete vibrators.

Bulletin 156 illustrates each type of equipment in the Berg line, and describes its principal features, the uses to which it is adapted, its power unit and the required sources of supply, and the equipment supplied with each tool.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 96.

Absorptive Form Linings

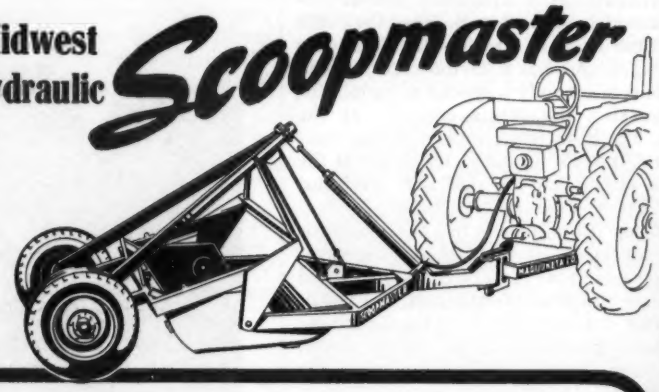
Absorptive form linings and their use are discussed in a new manual made available by the United States Rubber Co., 1230 Avenue of the Americas, New York 20, N. Y. Hydron is a special absorptive paper board faced with a ply of lightweight processed cotton sheeting. It is designed to improve the surface characteristics of the concrete and to produce a case-hardening effect.

The manual shows, by means of charts, photographs, and text, the features of Hydron, as well as the results of tests conducted on it. It contains instructions on how to handle the material and how to attach it to the forms. Specifications cover its length, width, and thickness; types of edges and corners; standard packaging; and methods, weights, and tolerances.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 25.

HANDLES ALL DIRT MOVING JOBS EASIER

Midwest Hydraulic Scoopmaster



ONLY 15 H.P. DRAW BAR PULL REQUIRED

One lever handles the loading, dumping, carrying, or spreading. Works easily around buildings. Ideal for soil conservation work and landscaping – builds terraces, dams, ponds, roads, etc.

It Loads -- It Carries -- It Dumps Without Stopping

(No Preliminary Breaking of the Soil is Necessary)

- Capacity 1 yard of dirt
- Converts to Grader
- Heavy cutting blade
- Moves over 60 yards an hour

"Handles Every Dirt Moving Job in a Hurry"

Send for free literature today

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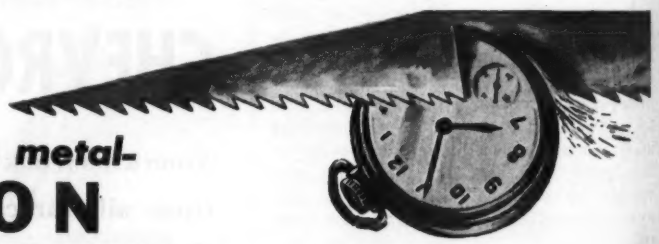

It cuts off minutes as well as metal-

the JOHNSON

metal cut-off BAND SAW

The Model J Johnson — the cut-off tool that's always busy in any shop.

CATALOG for the asking Write—

Lock your stock in the vise, drop the saw to the work, throw the switch . . . and watch the non-stop endless blade of the JOHNSON shear down through the metal for a clean, fast, accurate cut-off job. . . . All controls at operator's fingertips. Overall rigidity and extra-generous guide rolls help blades live long. Three-point suspension equalizes any floor.

TWO TYPES—Model J, a heavy sturdy tool cuts 10" rounds, 18" flats. Model B, lighter, portable, of rigid twistproof construction, cuts 5" rounds, 10" flats.

JOHNSON

MANUFACTURING CORP.

ALBION, MICH.

Airport Is Improved From Class 2 to 3

Contract Includes Grading, Draining, and Paving of 2 New 4,100-Foot Runways With Black-Top

✦ THE Lancaster Municipal Airport at Lancaster, in southeastern Pennsylvania, has been reconstructed and improved from a Class 2 to a Class 3 airport. This improvement is part of the National Airport Plan of the Civil Aeronautics Administration, with the cooperation of the local authorities of the City and County of Lancaster. The major phase in the improvement was the grading and draining of the field, and the construction of two new 4,100-foot-long black-top runways.

The engineering design of the improvement was handled by Thomas B. Bourne Associates, Inc., of Washington, D. C., who also supervised the construction. The latter was contracted to James D. Morrissey, Inc., of Philadelphia, Pa., on a low bid of $804,000. Work began in October, 1947, and the paving was completed by the end of 1948. The total cost of the project is estimated at $1,198,109 which includes, besides the major construction contract, the installation of a night-lighting system, and the seeding of the shoulders and graded areas.

Original construction at the airport dates back to a WPA project of 1934-1935 when the City and County of Lancaster supplied the grounds and materials, and the WPA looked after the design and construction, including labor and equipment. Construction was after the classic WPA pattern. Close by a hangar and administration building, three runways were laid out to form a triangle. They were built with a 6-inch stone base topped by a bituminous surface treatment. Two of the runways were 2,700 feet long x 100 feet wide, while the third was 2,200 feet long x 50 feet wide.

The airport was used chiefly for pleasure-craft flying, and had little commercial value except for a flying school which was based there. During the war, however, activity increased when naval cadets were given flight training at the field. But the runways were both too short and too thinly constructed to accommodate anything but light slow-moving planes. They were also located too close to the buildings for safe instrument landings. Consequently none of the original construction is used in the improved layout. The new runways are built more to the east, and away from the present hangar and administration building.

Longer Runways

With the new layout, the two runways are each 4,100 feet long. Runway 3, ENE-WSW, is 150 feet wide, while runway 2, WNW-ESE, is 100 feet wide. They intersect each other near their western ends. At present the field takes in about 185 acres, but the City and County have purchased large tracts of land adjoining the airport so that the area can easily be expanded to include 450 acres.

The airport is located 5½ miles north of Lancaster on State Route 501, and has an elevation of 402. Thus there is enough space available for the ultimate extension of both runways to lengths of 5,300 feet, and runway 2 may be widened to 150 feet, the same as runway 3. Also included in this contract are 3,500 feet of taxiways, 50 feet wide, connecting the runways and the hangar.

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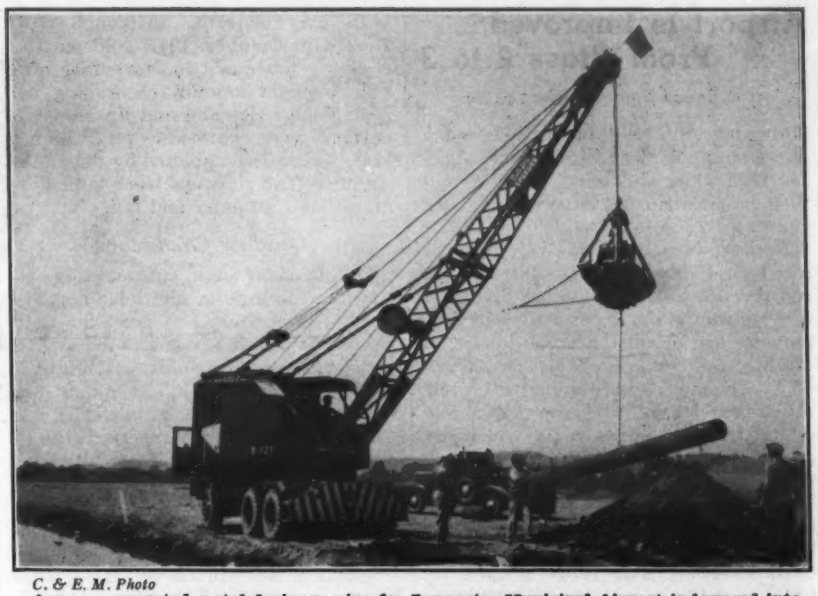

C. & E. M. Photo
Armco corrugated-metal drainage pipe for Lancaster Municipal Airport is lowered into a trench by a Link-Belt Speeder truck crane.

Mr. Contractor
Do You Operate a Power
TRENCHING MACHINE?
Eliminate the hazards and expense of tearing up mains, conduits and other underground installations with a
WILKINSON *Quality*
LINE LOCATOR
Guaranteed to locate accurately all underground pipes and cables.
Also indicates depths below surface.
Used by leading Contractors throughout the United States.
Write today for full information
WILKINSON PRODUCTS COMPANY
P.O. Box 1174, Wilshire LaBrea Station, Los Angeles 35, Calif.

WHEN OTHER BUCKETS HAVE GONE TO SCRAP . . .
. . . HENDRIX ARE STILL PRODUCING PROFITS!

★ Full Payload Every Trip . . . FOR MORE PROFIT!
★ Rugged All-Welded Construction . . . LOWER MAINTENANCE COST.
★ 12% Manganese Steel Chains and Fittings . . . STANDARD ON ALL TYPES and SIZES.
★ A Type for Every Job . . . light, medium, and heavy-duty. WITH OR WITHOUT PERFORATIONS.

Combining rugged construction, larger capacity, and low maintenance cost, HENDRIX DRAGLINE BUCKETS turn payloads into profits on every job. Dragline operators prefer Hendrix Buckets, because they are efficient and have proved their ability to dig more dirt at less cost. Long life and low maintenance cost result in bigger profits on all jobs. *Hendrix Dragline Buckets are tough . . . they're made to "take it!"*

HENDRIX Lightweight DRAGLINE BUCKETS

For descriptive literature ask your dealer or write

HENDRIX MANUFACTURING CO., INC.

MANSFIELD — LOUISIANA

Airport Is Improved From Class 2 to 3

(*Continued from preceding page*)

Ultimately this will be turned into a north-south runway, 4,000 feet long x 150 feet wide, and new taxiways will then be constructed to serve all three runways.

Both runways and taxiways are of dry-bound macadam, hot-mix surface construction. The maximum grade on any runway is but 1 per cent, and that only for a short distance, while on the taxiway the maximum grade is 1.3 per cent. The pavement is usually crowned at the center line. Shoulders are graded out from the edges of the pavement on a 1 per cent slope to include a minimum 400-foot width of landing strip.

Only a few trees had to be removed from the site which was farming country with a gently rolling topography. Of the 330,000 cubic yards of excavation, about 10 per cent was rock and the remainder was a good layer of topsoil with clay beneath. Although work started in October, 1947, cold weather shut the job down in November after only a slight amount of grading had been done. Grading and draining operations were resumed again in March, 1948, and were completed by the end of August. The runways were built during the late summer and fall.

Grading Operations

On the earth work, cuts and fills balanced out so that no additional material had to be borrowed to level the field. Grading operations consisted chiefly of removing the high spots and filling in the low places. The maximum cut was 10 feet in depth, and the highest fill was 13 feet. In rock, the deepest cut was 8 to 9 feet. For drilling holes, 2 wagon drills and 4 jackhammers—all Gardner-Denver—were available. Air was supplied by 3 compressors—a Gardner-Denver 365-cfm; a Jaeger 325-cfm; and a Schramm 105-cfm model. Holes were blasted with Hercules 40 per cent dynamite.

Rock excavation was handled by a Lorain 2-yard shovel and 5 Sterling 5-yard trucks. On the longer dirt hauls, averaging 1,000 feet, 4 Tournapulls averaging 12 yards, and a Caterpillar DW10 rubber-tired tractor and No. 10 scraper averaging 10 yards, were employed. For shorter dirt hauls, averaging 500 feet, 5 D8 tractors pulled LeTourneau 12 to 15-yard Carryalls. Five dozers were on the job for spreading the material in 8-inch lifts and compacting it with 3 sets of Blaw-Knox sheepsfoot rollers. The specifications required that all fills be compacted to a 90 per cent modified Proctor density, except under the pavement where 95 per cent modified Proctor was required. The cut sections were moist enough so that no water was added during the rolling.

Final shaping of the runway subgrade was done by two Caterpillar motor graders. When the machines were working anywhere near the older part of the airport, which was still being used by some small planes, they carried yellow flags at their highest points in order to be easily spotted from the air.

Draining the Field

The field drains in three directions—to the southwest, the west, and the northeast. Catch basins are placed at frequent intervals, and a line of 6-inch underdrain is located along some edges of the runways. Larger pipe, from 10

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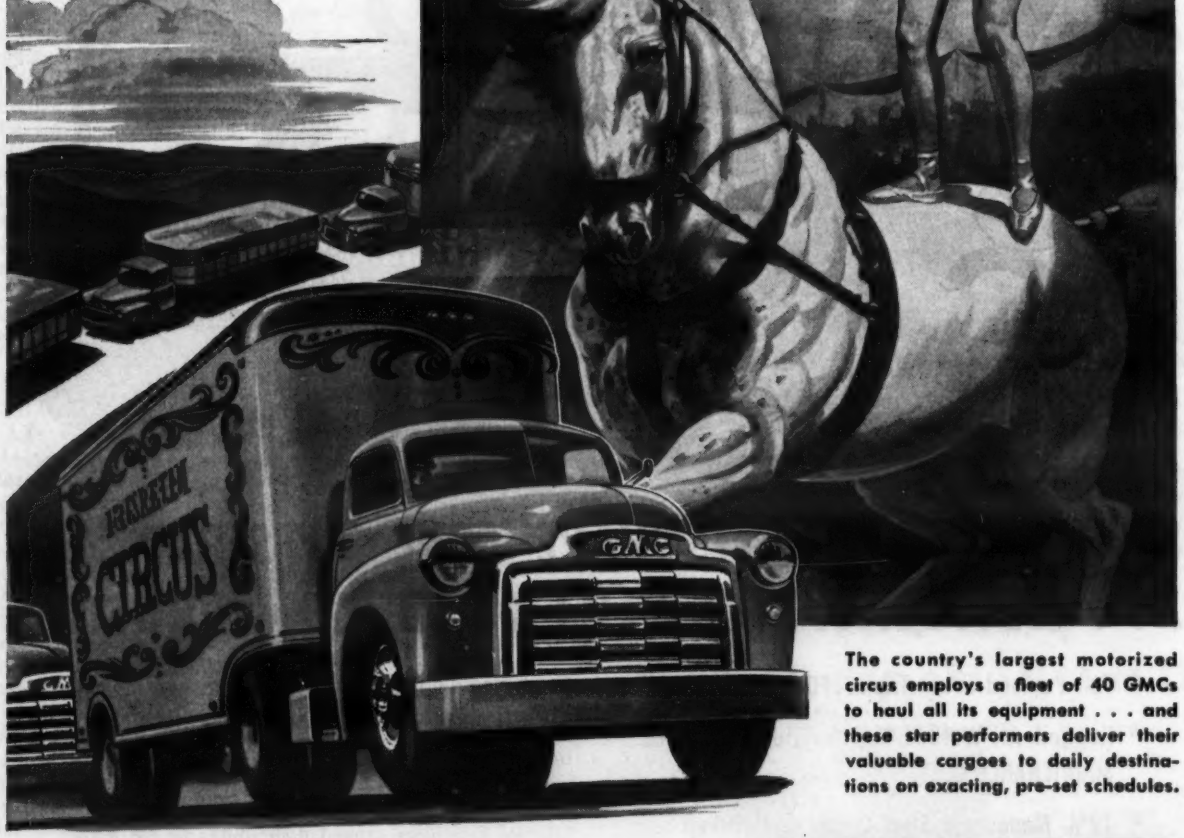


The country's largest motorized circus employs a fleet of 40 GMCs to haul all its equipment . . . and these star performers deliver their valuable cargoes to daily destinations on exacting, pre-set schedules.

GMC trucks are preferred for tough, rugged going . . . they are given top billing by thousands of truck operators whenever the job calls for high level dependability and performance.

GMCs have won this acclaim because they are products of the world's largest commercial vehicle manufacturer . . . because they are built with truck engines and chassis . . . because they provide a full measure of everything truck owners and drivers want.

This goes for heavy construction transport, as it does for all other hauling. For here, as elsewhere . . . in engines, models and chassis types designed and engineered to meet the needs of every job . . . GMC performance is star performance—every time.

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

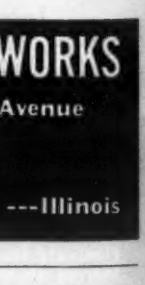
GMC TRUCKS
The Key to Greater Truck Value
GASOLINE · DIESEL

WARRINGTON-VULCAN
Single-Acting Steam
PILE HAMMERS

● This rugged pile driver doesn't monkey with the tough ones. It socks 'em and sinks 'em with scientific power that saves strain on the pile and the pile hammer.

The rapid, regular, continuous action of the Single-Acting Warrington-Vulcan is readily adapted to driving all types of piles—wood, steel or concrete. It operates at medium steam pressure and delivers a moderate frequency of low velocity blows from a relatively heavy ram. Money-saving performance, sturdy construction and simple design exposing all working parts for easy accessibility have made this pile driver a favorite on the tough jobs since 1887.

Full details, without obligation. Write today.



VULCAN IRON WORKS Since 1852
329 North Bell Avenue
Chicago 12 ---Illinois

MOVING? Be sure to give us 30 days' notice of your change of address—and let us have your old as well as your new address.

Unless you do this you may skip an issue or two before the correction is made—and you won't want to be missing any issues of CONTRACTORS & ENGINEERS MONTHLY these days!

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Ave., New York 16, N.Y.

C. & E. M. Photos

Rock-excavation and ditching scenes at Lancaster Municipal Airport—above, Gardner-Denver jackhammers doing their stuff, powered by a Gardner-Denver 365-cfm compressor; at right, a Buckeye ditcher digging a trench for pipe underdrain.

to 36-inch in diameter, conducts the storm water to points beyond the limits of the field where the drainage follows the natural fall of the terrain. All the pipe used on the project is Armco corrugated metal.

Trenches for the 6-inch underdrain at the sides of the runways were dug by a Buckeye ditcher to a width of 12 inches and an average depth of 3½ feet. Excavation for the larger pipe and drainage ditches was done either by a Bucyrus-Erie 20-B ¾-yard drag shovel, or by a Link-Belt Speeder truck crane equipped with a 30-foot boom and an Owen ½-yard clamshell bucket. A Lorain ¾-yard truck crane also saw some service on the job. The larger-size pipe was usually set by the truck cranes.

Black-Top Paving

Work on the pavement base course got under way in August. The stone base of the old runways was ripped up, and the material was salvaged for spreading as a 3-inch foundation course for the new runways. Over this a stone sub-base 6 inches thick was laid in two courses. The stone sub-base was increased to 9 inches in thickness at the final 400-foot ends of the runways, at the taxiways, and at the intersections of the runways and taxiways, where planes would be standing to warm up or else moving slowly with their engines turning at high speeds. The stone from the old runways, averaging 2 inches in size, was stockpiled on the field and then laid as the grading progressed. All of the sub-base stone passed the 2-inch sieve, with from 10 to 70 per cent passing the No. 40 sieve.

The new stone used on the project came from the quarry of D. M. Stoltzfus & Son of Talmage, Pa., and was hauled 7 miles to the airport in trucks. Apsco spreaders laid the stone, and the lifts were compacted by smooth-wheel rollers. Four of these were on the job —3 Buffalo-Springfield 10-ton 3-wheelers; and a Galion 10-ton tandem roller.

Above the stone sub-base, 8 inches of dry-bound macadam was laid in two courses. The large 3-inch-down stone was choked with screenings, and each course was broomed and rolled. Then the surface was primed with RT-3 tar, applied at the rate of 0.25 to 0.5 gallon to the square yard. This was covered with a ½-inch thickness of keystone mat. The mat consisted of an application of 150-225 penetration asphalt, 0.3 to 0.4 gallon to the square yard, which was covered with from 40 to 60 pounds

(*Concluded on next page*)

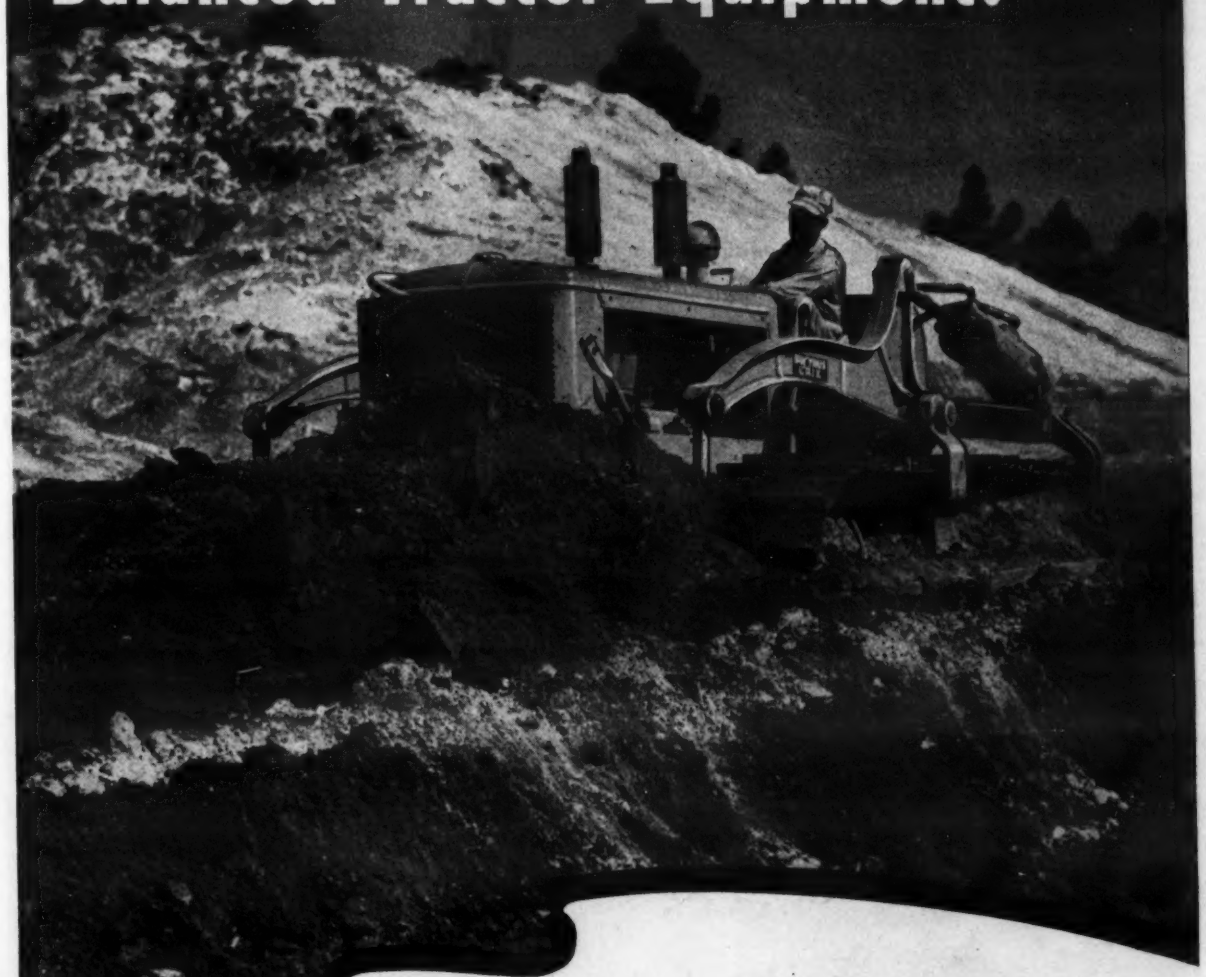
designed, made-to-order

Seats (for road equipment, construction machinery, any special equipment, and farm implements.

Put S-E-L-L in your equipment. Add a comfortable, custom-built seat. Leave the details to us. Show us your requirements —for equipment in planning or production —we do the rest. Designed and made within cost specifications. Thousands of our seats used. Write, wire . . .

FLEISCHER-SCHMID CORP.
Box 99 Columbus, Nebr.

Move More Dirt with BUCYRUS ERIE Balanced Tractor Equipment!



YOU get greater output at lower cost with Bucyrus-Erie hydraulic Bullgraders and bulldozers because they are balanced to take full advantage of tractor power. There is virtually no change in the tractor balance point when a Bucyrus-Erie Bullgrader or bulldozer is added, so there's no loss of tractive effort — as in a nose-heavy machine. This means more power delivered to the blade to move more yards of dirt per tractor horsepower.

Bucyrus-Erie balanced equipment means advantages in upkeep and repair costs, too, because operating stresses fall on the parts of the tractor that are designed to take them. The result is less wear and tear on the tractor, lower maintenance costs and longer machine life. *Bucyrus-Erie Company, South Milwaukee, Wisconsin.*

143749

See Your INTERNATIONAL Industrial Tractor Distributor

Airport Is Improved From Class 2 to 3

(*Continued from preceding page*)

to the square yard of ¾-inch-down keystone.

Stone Gradation

The gradation of the stone used in the above operations was as follows:

Sieve Size	Per Cent Passing		
	Macadam Base Stone	Screenings	Keystone Mat
3-inch	100	...	...
2½-inch	90-100	...	...
1½-inch	25-60	...	...
¾-inch	0-10	...	100
½-inch	...	...	90-100
⅜-inch	...	100	40-70
No. 4	...	85-100	0-15
No. 8	...	...	0-5
No. 100	...	5-25	...

Hot-Mix

The keystone mat was next topped with 1½ inches of hot-mix asphaltic concrete, except on the taxiways and for the final 200 feet of the runways, where the thickness of the course was increased to 2 inches. The plant-mix was furnished and laid by Lanc Valite, Inc., of Lancaster. Following the hot-mix, the surface was sealed with 0.15 to 0.30 gallon of RC-2 asphalt to the square yard, and covered with ¼-inch-down aggregate spread on at the rate of 7 to 20 pounds per square yard.

The specifications for the hot-mix and the seal cover coat were as follows:

Sieve Size	Per Cent Passing	
	Hot Mix	Seal Cover Coat
1-inch	100	...
¾-inch	82-100	...
½-inch	70-90	...
⅜-inch	60-82	...
¼-inch	...	100
No. 4	42-70	70-100
No. 10	30-60	10-50
No. 40	15-40	0-5
No. 80	8-26	...
No. 100	...	0-1
No. 200	3-8	...
Asphalt	4½-7	...

C. & E. M. Photo
Superintendent D. M. Gardner (left) represented Morrissey on the Lancaster Airport contract, and Resident Engineer G. D. Crow was in charge for Thomas B. Bourne Associates, Inc.

Quantities and Personnel

The major items in the grading, draining, and paving contract included:

Grading	330,000 cu. yds.
Paving	137,500 sq. yds.
Subsurface drains, 6-inch	5,000 lin. ft.
Storm drain lines, 10 to 36-inch	10,000 lin. ft.
Catch basins and manholes	51 ea.
Fencing	750 rods
Underground ducts, 3-inch	4,610 lin. ft.

The fence is of hog wire, 4 feet 2 inches high, strung on wooden posts set 16½ feet apart. At the top of the fence are 2 strands of barbed wire.

Contractor James D. Morrissey, Inc., of Philadelphia was represented on the project by D. M. Gardner, Superintendent, who supervised the working force of approximately 100 employees.

The new lights at the airport were installed by the Lancaster Electric Co. Another separate contract for seeding the field was awarded to Hinkle & McCoy of Philadelphia, which completed its work this spring.

G. D. Crow was Resident Engineer in charge of the project for Thomas B. Bourne Associates, Inc., of Washington, D. C. For the Civil Aeronautics Administration, Albert H. Wessel is District Airport Engineer with headquarters at New Cumberland, Pa.

LIMA TYPE 802
SHOVEL and CRANE COMBINATION
Solves an "unusual" Construction Problem

TELEPHONE BALMORE 8-1600

DEL BALSO CONSTRUCTION CORPORATION
500 ZEREGA AVENUE
NEW YORK 61, N.Y.

October 15, 1948

Construction Equipment Corporation
11-22 Forty-Third Avenue
Long Island City 1, N. Y.

Gentlemen:

As of the time of writing this letter, we have been working on the construction of the Brooklyn-Queens Connecting Highway for about two years and during all that time the two key machines on this project have been the Lima 802 shovel and crane combinations which we purchased from you.

As you know, this contract presented an unusual concrete placing problem because of the narrowness of Furman Street and the height of the three deck cantilever highway which we are constructing. We were forced to work very close to the structure and at the same time had to effect maximum reach. To do this, as you know, we put a 40 foot adjustable jib on a 70 foot boom to give us what in effect is a goose-neck. We have been pouring approximately 40,000 yards of concrete to-date with these two machines.

Our contract also involves a sizeable shovel excavation job which had to be done sporadically. We found it a very simple operation to change one of these machines from a crane to a shovel at very short notice.

In addition, during the past two years we have not shut the machine down at any time for repairs due to breakdown or mechanical failure.

We have been most pleased with the performance of these rigs and their adaptability to meet a special and very difficult situation.

Very truly yours,

DEL BALSO CONSTRUCTION CORPORATION

On this job, the crane operator had to work "blind" most of the time. Traffic had to be maintained, ruling out gantry-type cranes. Heavy equipment was barred in this residential area. The only effective way to place concrete and other materials was with a crane that combined the ultimate in *flexibility* and *capacity*. LIMA 802's did the job perfectly!

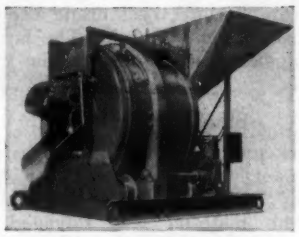
Machine illustrated has 70 ft. boom, 40 ft. jib and 2 yard bucket. Note that clearance at rear of machine and front of boom is practically nil.

The two standard LIMA 802 combination machines owned by Del Balso have worked safely—under UNUSUAL conditions—for two years without "down-time"—a tribute to their tremendous reserve of lifting power and capacity. The LIMA line includes Shovels ¾ to 6 yds., Cranes 13 to 110 tons and Draglines variable.

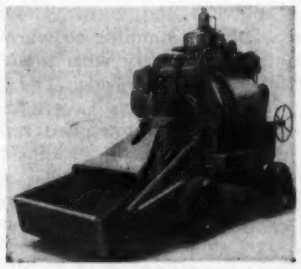
It will pay you to consult your nearest Lima Sales Office or representative before you buy your next shovel, crane or dragline. Offices in principal U.S. cities.

Lima Shovel and Crane Division
LIMA, OHIO
OTHER DIVISIONS: *Lima Locomotive Works Division; Niles Tool Works Co.; Hooven, Owens, Rentschler Co.*
LIMA HAMILTON CORPORATION

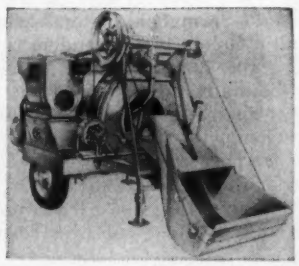
MONEY-MAKING
MC
MIXERS



CMC 56-S TWO-YARDER
Specifically designed to facilitate increased Central Plant production on big jobs or in commercial plants. Advanced CMC engineering and features assure FASTER, SMOOTHER, and MORE EFFICIENT operation. Equipped with Timken Bearings throughout. Renewable hardened steel drum liners and hard alloy coated discharge buckets insure extra long life. Hydraulic finger-tip controlled charging and discharging.



NEW CMC 16-S HYDRAULIC
New hydraulic charging makes this new CMC 16-S Mixer the SMOOTHEST, EASIEST-OPERATING mixer on wheels. All spools and cables vulnerable to wear and breakage eliminated. Does away with intricate clutch and brake adjustments. Truly the modern approach to mixing perfection.



CMC 6-S TRAILER
HERE IS THE MOST VERSATILE MIXER ON WHEELS. Superior CMC design assures faster charging. This high-speed, non-tilt unit incorporates all the plus-value features that have made CMC mixers "tops in the field."

Write today for latest illustrated catalog and prices.

CONSTRUCTION MACHINERY COMPANIES
WATERLOO, IOWA

The Red Cross Carries On!
GIVE!

As the name suggests, the blade of the Model X36AF Uni-Point radial saw enters the work at the same point in the table regardless of the crosscut angle.

Radial Saw Designed For One-Point Cutting

The newest-model radial saw made by the American Saw Mill Machinery Co., Hackettstown, N. J., has one-point-cutting design. The saw blade enters the work at the same point in the table regardless of the crosscut angle, the company points out. The Model X36AF saw is powered by a 3, 5, or 7½-hp electric motor.

Among the other features claimed for the Uni-Point saw are increased raising and lowering capacities, easier adjustment of miter angles, protection against impregnation of sawdust in the telescoping ram, and newly designed wipers at the front and back of the ladder roller bearings to keep the track clear of dust. The ripping gage on the telescoping ram is fitted with an adjustable pointer designed to permit a high degree of accuracy in setting up work and in cutting.

An automatic spring pin finder locates and locks the motor in various positions for crosscutting, ripping, ploughing, boring, dadoing, and similar horizontal cutting positions. It also serves to locate vertical motor positions for shaping, notching, jointing, and routing. The locking handles operate with a twist of the wrist, the manufacturer states.

Further information may be secured from the Company. Or use the Request Card at page 16. Circle No. 59.

Asphalt-Paving Equipment

A manila-bound folder containing several bulletins on asphalt-paving equipment has been made available by Hetherington & Berner, Inc., 731 Kentucky Ave., Indianapolis 7, Ind. These include Bulletin MP-47 on the H&B Moto-Paver; Bulletin S-46 on stationary asphalt-mixing plants; Bulletin M-44 on the Model M portable mixing plant; Bulletin C-44 on a portable mixing plant for low-cost bituminous mixers; Bulletin F-47 on an asphalt-plant feeder; Bulletin D-47 on aggregate driers; Bulletin M-45 on asphalt mixers; Bulletin S-47 on jacketed pipe and fittings; and Bulletin F-46 on the automatic liquid-metering Fluidometer.

Each bulletin contains complete data on the type of equipment it describes, including its features, operation, and specifications. The bulletins are printed in color, and pictures help the reader to visualize each piece of equipment as well as its component parts.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 13.

Election Is Held by NCPMI

John M. Palmer has been re-elected President of the National Clay Pipe Manufacturers, Inc. Also re-elected were D. M. Strickland, Vice President, and John D. Cook, Secretary-Treasurer.

Air-Compressor Unit

A 160-cfm truck-mounted compressor is available from the Davey Compressor Co., Kent, Ohio. The new Auto-Air unit is driven by the truck engine through a Davey P-85 heavy-duty power take-off. According to the manufacturer, the compressor can be mounted directly on the truck chassis or on a platform base.

The compressor is a V-type and has three low-pressure cylinders and one high-pressure cylinder. It is 46 inches long, 67 inches wide, and 50 inches high. It weighs 1,600 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 97.

Ripper With Rubber Tires

Rubber-tired rippers are described in a broadside prepared by the Arrow Mfg. Co., P. O. Box 4120, S. Denver Station, Denver 9, Colo. The Arrow rippers are made in three sizes requiring tractors with horsepowers of 60 and under, 60 and up, and over 75. They have weights of 5,000, 8,000, and 12,000 pounds.

The broadside describes seven features claimed for these rippers, including the use of rubber tires for less shock or strain, heavy-steelplate construction, replaceable welded overlay of tough steel on the cutting edges, positive locking action to prevent strain on cables when the ripper isn't in use, instant control, tough universal coupling, and cast roller-bearing sheaves.

Specifications listed cover the weights, dimensions, clearance and number of teeth, distance between teeth, depth of penetration, tires, wheel bearings, sheaves, type and method of control, length and size of cable required, and horsepower requirements.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 23.

YOURS FOR THE ASKING

Further information or descriptive literature can be secured from any advertisers in this issue of CONTRACTORS & ENGINEERS MONTHLY. Just write name of manufacturer and product of interest to you on the extra line provided on the post card facing page 16, fill in your own name and industry connection, mail to us and we'll do the rest.

CONTRACTORS & ENGINEERS MONTHLY
470 Fourth Avenue **New York 16, N.Y.**

How long should a CONTRACTOR'S truck last?

The life of any truck depends upon many things.

It depends upon the miles the truck is driven; on the care taken to keep it in good condition.

But more than all else, truck life depends on how closely the truck *fits* the job it must do.

Dodge *"Job-Rated"* trucks last longer, and at *low* maintenance cost . . . because they *fit the job.*

It stands to reason that you waste money with a truck that's too big for its job; or, if your trucks are too small for the job, you're in for plenty of costly maintenance expense . . . and early replacement.

From 248 basic chassis models your Dodge dealer can specify a truck that will be *"Job-Rated"* exactly for your hauling job.

Such a truck will have the right one of 7 great truck engines . . . *"Job-Rated"* for top efficiency and economy. It will have the right units throughout . . . to haul *your* loads, over *your* roads.

And remember . . . only Dodge builds *"Job-Rated"* trucks. Talk to your Dodge dealer!

For the good of your business—

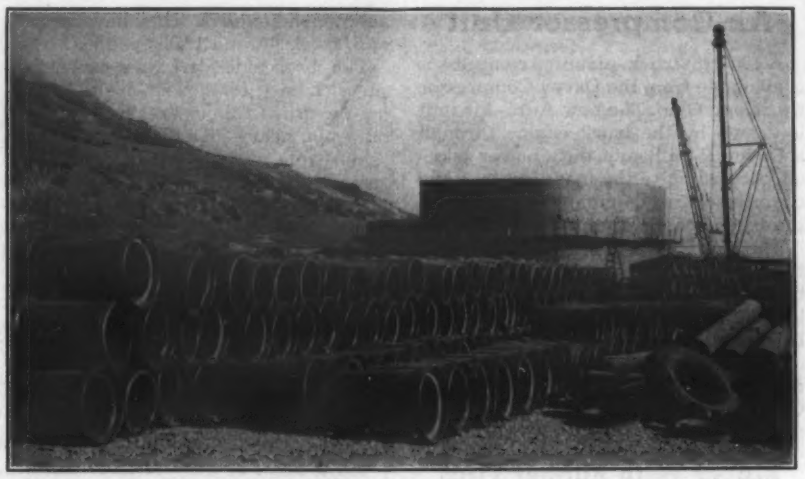
Switch to DODGE "Job-Rated" TRUCKS

Clay Pipe Is Used For Refinery Lines

A refinery with an estimated capacity of 25,000 barrels of crude oil per day is under construction a few miles north of Salt Lake City. The imposing stacks and distillation towers of the Salt Lake Refining Co.'s new $5,000,000 plant are rising on a flat sage-covered site at the base of the Wasatch Range—at the terminus of a 182-mile pipe line from Rangely, Colo.

Engineers constructing drainage, run-off, and sewage installations encountered the problem of laying pipe in soil with an excessive alkali content, and installing a sewer system capable of resisting deterioration and corrosion from acid in the waste discharge from refining processes. They decided upon vitrified-clay pipe, and a total of 8,700 feet ranging from 4 to 21 inches in diameter was used.

The plant was designed under supervision of the engineering department of the Standard Oil Cos. of California. It is being constructed by the Bechtel Corp. of San Francisco.



Because of its acid and alkali-resistant properties, vitrified-clay sewer pipe is being installed at the Salt Lake Refining Co.'s new $5,000,000 refinery.

Non-Technical Discussion Of the Automotive Diesel

A non-technical discussion of the development, operation, and maintenance of the automotive diesel engine has been made available by Mack Trucks, Inc., 350 Fifth Ave., New York 1, N. Y. Written in easy-to-understand language, it covers all subjects connected with the theory of the diesel engine as applied to automotive uses.

This 67-page booklet tells how the diesel differs from the gasoline engine and describes its operating cycle, compression ratios, types of fuel used, economies possible, and efficiency. It discusses six types of combustion systems, the advantages and disadvantages of 2 and 4-stroke engines, problems connected with fuel-injection systems, diesel-engine control, diesel economies, and starting and stopping of diesel engines. It is thoroughly illustrated with drawings and charts.

Also available is a newly printed catalog on the 150-hp Model END-672 diesel. The catalog illustrates several features of this engine including the crankcase, timing gears, diagonally-split connecting rods, cylinder heads, counterbalanced crankshaft, central starting heater, centrifugal water pump, directed-flow cooling, and the air compressor. Also described are the automatic timing, controlled combustion, and controlled fuel distribution. A complete list of specifications covers all working parts, dimensions, and rated capacities.

Copies of this literature may be obtained from the company, or by using the Request Card at page 16. For a copy of "Understanding the Automotive Diesel", circle No. 17; for the catalog on the Model END-672 diesel, circle No. 18.

Gas-Welding Supplies

A new catalog on gas-welding supplies has been brought out by Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. It describes 19 different gas-welding rods and 8 different fluxes, and includes a section on silver brazing alloys plus a page on carbon rods and carbon plates.

Text material in the 16-page catalog offers descriptions of the mechanical properties of the various products and recommendations regarding their applications. Data on lengths, packaging, and available diameters are included for each welding rod.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 123.

WARSOP Saves You Money 2 Ways!

● WARSOP ROCDRILL, self-contained, designed for heavy duty service.

● WARSOP BREAKER has no hose, cables, compressors or batteries

WARSOP Road Breakers and Rock Drills will save you money two ways on your next contract.

1. LOW CAPITAL OUTLAY—and being powered by a dependable built-in gasoline engine, their self-contained design eliminates costly compressors, cables, hoses, and batteries.
2. LOW RUNNING COSTS—can be easily handled by any type of labor, costs only a few cents per hour to operate. Extreme portability eliminates transport expense.

The most economical tools for breaking concrete, general demolition, trench spading, asphalt cutting, light tamping, sheeting, driving, and all classes of Rock Drilling.

● *Dealers inquiries invited.* ● *For full details write to:*

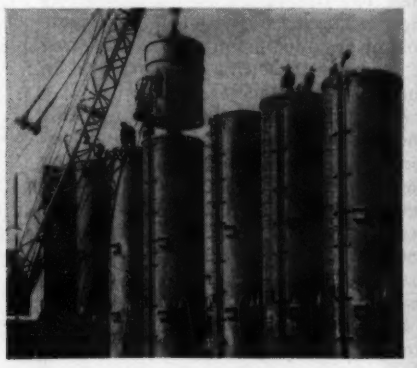
WARSOP POWER TOOLS, Inc.

347 North 12th Street, Philadelphia 7, Pa.

NEW YORK TORONTO MONTREAL JOHANNESBURG LONDON

VIBER SAVES TIME AND COST IN CONCRETE CONSTRUCTION

TESTS of NEW DESIGNS and DEVELOPMENT in VIBER EQUIPMENT PROVE INCREASED EFFICIENCY AT LOWER MAINTENANCE COSTS

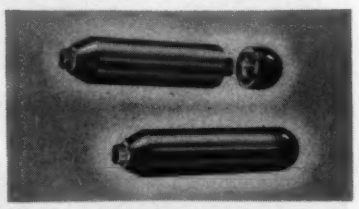


PX-6 EXTERNAL VIBRATOR EXTREMELY EFFECTIVE IN MANUFACTURE OF CONCRETE PRODUCTS AND HANDLING OF DRY MATERIALS

The proper balance of amplitude and speed over a wide range produces marked improvement in the manufacture of concrete pipe and greatly increases the life of the forms. Many placement problems have been solved by this new vibrator.

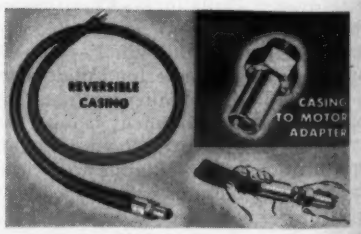
VIBER RUBBER TIPPED VIBRATORS REDUCE FORM DAMAGE

Damage to expensive form lining materials necessitating frequent form replacement was the reason for development of Rubber Tipped Vibrators. Severe tests on many large concrete jobs proved costly grinding due to damaged forms was greatly reduced. Another advantage of Viber's Rubber Tipped Vibrators is replaceable tip. Simply unscrew worn part and install new tip.



REVERSIBLE FEATURE PRACTICALLY DOUBLES THE LIFE OF CASINGS

Standard 6, 12 and 21 foot interchangeable Viber casings are reversible. Reversing is easily accomplished by unscrewing adapter and attaching it to the other end. All cores are reversible. Viber casings are covered with durable, live, tire quality rubber.



For further information or descriptive literature on Viber equipment, please write Dept. 25

VIBER COMPANY *Concrete Vibrators Since 1931*

726 South Flower Street Burbank, California

Portrait in Print

By RAY DAY

Old Individualistic Spirit Needed In Contracting, Says H. L. Perkins

✦ GREAT accomplishments often result from the major crises of life. And there is no security more conducive to individual living than insecurity.

These seem like strange words of another era, but they come from a man who ought to know. At least once a week or oftener, a crisis of some kind confronts him. Every day he wrests from life a new chapter of adventure and friendship which only his kind of insecurity can give.

He is H. L. Perkins, General Contractor, Dairyman, Breeder of registered Hereford cattle, Big Game Hunter, and Humanitarian, of Nevada, Mo. While Nevada is his home, more or less officially, he is widely known and respected throughout the four-state area of Missouri, Kansas, Oklahoma, and Texas. His name is familiar also in various parts of the entire nation.

He has left his mark as a contractor in the bituminous streets of Kansas City; in the pipe lines of Oklahoma; in the war camps of Texas, Colorado, and Kansas; in the highways of Missouri; and in many another part of the country as well. Perkins pioneered much of the development and application of bituminous-highway methods in the midwest, and some of the roads he built 25 years ago are still giving good service today.

He has retired from contracting three times. He has pushed some of his hobbies—like dairy farming and registered Hereford cattle, for example—into full-time avocations. He has traveled, gone hunting or fishing, or visited prominent ranches over the west. Each time the old gambling spirit of every good contractor has stirred him. It may be that, or the acrid smell of hot asphalt, or perhaps the competitive urge to pit his brains against whatever uncertainties Mother Nature can dish up, which brings him back.

Today Perkins' doctors have forbidden him to fly. His heart won't let him stalk an elk in a high mountain pass. It won't permit him to climb a high hill to examine a job first-hand. And yet it won't permit him to stop building things—at least not while there's work to be done.

"When you see the day arrive when men lose that individualistic spirit, contracting is done," he says.

Personalized Jobs Make Money

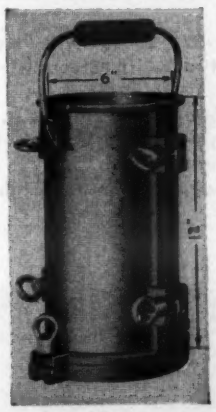
For small, medium, and large contractors, Perkins believes the only solution to be more personalized supervision by the owner. He has learned, sometimes the hard way, that it is the only method to make a job pay off.

"The old days when you could sit on your office chair and bid jobs several hundred miles away, then send a superintendent out and hope he made money, are over," Perkins declared flatly. "A new kind of contracting must come into vogue rapidly, or the age of contracting

(Continued on next page)

C. & E. M. Photo
This candid shot was made in the Tulsa office of Contractor H. L. Perkins as he took a long-distance telephone call.

MOLINE CONCRETE TEST CYLINDER MOLD



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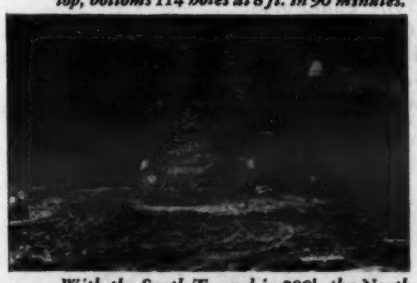
16-drill jumbo, with 2 hydro drill jibs on top, bottoms 114 holes at 8 ft. in 90 minutes.



With the South Tunnel in 200', the North Tunnel jumbo is readied for the first round.

At the Squirrel Hill Tunnel project in Pittsburgh, you'll find JOY Equipment in all the key spots, keeping the work of driving twin 28 x 32-foot tubes going at full speed. Twenty-six T-350 Drifters with pistonmotor feed; four hydraulically-operated Hydro Drill Jibs; five Series 1000 high-pressure Axivane Fans; four heavy-duty, semi-portable WN-102 Compressors; hundreds of feet of String-a-Lite lighting equipment—all were chosen for their efficiency, ruggedness and field-proved dependability. ● Joy Machines can do the same fast, low-cost job for you. Let us work with you.

Four WN-102 Compressors, each delivering 723 CFM at 100 psi, serve the drills.

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Old Spirit Needed, Says H. L. Perkins

(*Continued from preceding page*)

as such may pass.

"It would help to bring contract costs down if each owner would give his business more of his personal supervision. A contractor should get to know every detail of his business better; he should study all its phases with the same exacting care a doctor uses in diagnosing a case in the human body.

"The business end in the office, the proper knowledge of costs and so on, are equally important with field work. Financing, planning, and purchasing are vital to the success of a contract job.

"There is no man who can run your business better than you can run it yourself," Perkins concluded. "And that goes for just about everything you can engage in—business, pleasure, recreation, religion, or life itself."

Just how firmly he believes in this philosophy can best be illustrated by going back to a hospital in the east after the close of World War I. Perkins lay there with a bullet in his left shoulder, a plate in his skull, and a gaping shrapnel wound in his midsection.

He had plenty of time to think. With his Army service in the 23rd Railway Engineers behind him, he concluded that he wasn't ready to die. There was other work to do.

He arranged for private medical care through his old family physician, and spent months in a private sanitarium in Missouri. Slowly he regained his health. The old family doctor was afraid to risk an operation to remove the bullet, but Perkins still gets around all right with this impediment lodged in his left shoulder.

"I still believe I got more personal attention and better medical care privately than what the salaried doctors were able to give me," he said.

Message to Young Contractors

That, briefly, is the gist of what Perkins would like to see in the contracting business. More individualism. More personal attention to business. More will to succeed.

He is frankly pessimistic about the chances for a new contractor to succeed generally. He believes the cards are stacked against individual success unless the individual makes a superhuman battle to win out. He believes success comes harder nowadays than it did 25 years ago, partly because of the loss of incentive and partly because of socialistic impedimenta placed in the individual's path by the majority opinion of voters in the nation.

The man's earnestness and sincerity are never more apparent than when he analyzes the actions of a contractor who has been successful; who has "made his pile".

"Consider this man from the standpoint of cold fact," he says. "Here he is. He has worked hard for 30 or 35 years to make his money. Say he has $250,000 salted away in rental properties, real estate, bonds, or cash. It is all he and his wife can ever spend.

"But the old urge takes hold. Retirement gets boring because of the loafing it causes. No good contractor ever made a good loafer. So the man gets back in. He mortgages his properties, he dips heavily into his cash, he gets back in business. For his efforts he may be rewarded by miles of red tape, ulcers, worry with men who no longer care to produce, and at most by about a 4 per cent profit on his contract. What incentive is there for him to work?

"The only conclusion you can reasonably reach is that this man is a damned fool to make such a gamble. Yet, unless the contracting business continues to attract exactly this kind of damned fool, it will die. Socialized contracting will take its place as surely as socialized medicine, socialized security, and all the other 'isms' which are knocking at the door."

Perkins "retired from retirement" three times, partly, he says, because he was enthusiastic about being this kind of fool. and partly because of old friendships he had made over the years. In two cases, a business crisis involving an old friend brought him back to the contracting field from his farms near Nevada, Mo. During the last war he engaged in large-scale war-camp construction.

"I don't want to wave any flags, understand, but I felt that I owed whatever ability I had to this God-given country which endowed us all with so much," he explained. Eleven tough jobs convinced him that his part of the debt was liquidated. They were profitable, but they took a great deal out of him.

The Perkins Personal Touch

How Perkins handles a crisis on one of his jobs is a model of self-control any contractor or superintendent might do well to copy.

The day before he was interviewed, Perkins had driven south from Kansas City for 5½ tension-filled hours. He got to one of his jobs about an hour before quitting time. On this job he had gambled on the executive ability of one of his key men, made him a superintendent, and left him in charge of his first job.

Now the project was a mess. Operations were bunched up in a bottleneck. The backhoe wasn't out in front as it should be. The pipe layers had caught up and were loafing around. An extra-size labor gang, hired to backfill pipe near the street bottleneck, was not able to work productively. Perkins wearily took a look around, gave it the remaining hour to iron itself out, and without saying a word went to his hotel.

Next morning he went out to the job early. The superintendent was nearly frantic. He paced up and down the ditch, yelling orders to all hands. Perkins chose the opportune moment when the attention of the gang was diverted, and motioned for the superintendent.

"How can you hope to control this gang of men when you can't control yourself?" he asked. "If you get rattled, other people around you can't help doing the same. Now go up to the restau-

(*Concluded on next page*)

Improved

FOR INCREASED PRODUCTION

A few of the new features that cut down-time and increase hourly earnings

- NEW Heavy Duty Constant Mesh Transmission
- NEW 32-amp. Generator
- NEW 12 cu. ft. Piston Type Compressor
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PLUS all these original high production features

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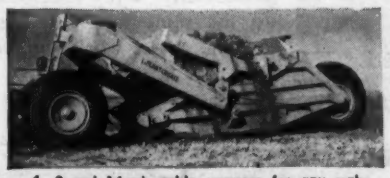


6, 8 and 14-yd. cable scrapers for any make of track type tractor.

2 and 4-yd. hydraulic scrapers for track type tractors.

2 and 4-yd. hydraulic scrapers for industrial rubber-tired tractors.

LaPLANT CHOATE

rant there and get yourself a cup of coffee. Think it over. Relax. Then come on back here and we'll get this thing lined out."

In 30 minutes the men were swinging slowly back to the routine of pipe laying. In an hour they had speeded up. In two hours the job was clicking along full tilt, and despite this, the backhoe had passed over a tricky piece of ground and put distance between its dipper and the pipe gang.

"All we had to do was to get some timbers thrown under the backhoe, and relax the pressure on the pipe crew," Perkins explained. "Simple things often accomplish amazing results."

Early Life Was Rugged

Any biographical sketch of Perkins should properly begin, perhaps, back in the 1800's. For the man's make-up consists of pioneer characteristics of those early days, when his grandparents migrated from Pennsylvania to the midwest. Bad fortune overtook their wagon train, and when the oxen died, cows had to be hitched to the wagon. The last money they had was spent to ferry the Missouri River near Westport, Mo.

Hard work at farming paid off, however, and Perkins was born in 1894 in what is now Edgerton, Kans. His formative years were mostly filled with the hard farm life of the region. What formal schooling he obtained was the result of a 28-mile trip each day by saddle horse.

Broke, hungry, away from home, and looking for a job after his convalescence from the war, Perkins found himself stranded in Kansas City. While looking for a place to sleep late one afternoon, he happened on a construction job, down under a bridge near the Inter-City Viaduct.

"I guess I must have sounded plenty forlorn when I asked this man Hansen if he needed help," Perkins recalls. "At any rate, he told me to report the following Monday. That was almost a week away. I reported next morning to learn as much as possible about the job."

For almost a month, Perkins ate and slept wherever he could. The fifth of the month passed, then the fifteenth. Nothing was said about a paycheck, and Perkins felt that he should not ask. When the first of the following month finally came, Perkins' belt was tightened to its last notch. Nonetheless he was so staggered by the size of his month's check—$160—that he asked the paymaster if he hadn't made a mistake.

The superintendent spoke up. "There's no mistake," he said. "You said nothing about salary. That's why I hired you. I didn't need you then, but I do now. You've got a steady job."

Perkins stayed with the Barrett Co. for several years, finally leaving to start a construction business. A banker who took an interest in Perkins advanced $3,000 to start him in the contracting business.

"It was the same as a $30,000 loan today," Perkins said. "I'd personally like to see the day return when our dollar means 100 cents."

From that point on, Perkins' rise has been steady. Today he is a successful general contractor. He can bid a $1,000,000 job on his own. He owns one of the finest dairy registered Hereford herds in Missouri, but that is just a sideline. Married rather late in life, he has but one daughter, a stepchild, who is his top cowhand and farm manager. And he and Mrs. Perkins are still close companions wherever their travels take them. Mrs. Perkins frequently goes along with him, when they are not both enjoying their home in Nevada, Mo.

The day of this interview, Perkins had taken the trouble to call quite a few of the old friends who had made life's path for him a bit easier in those early years. "It was worth the telephone bill a thousand times over to express my gratitude for all they had done for me," he said. How much indirect good these telephone calls may have accomplished is anybody's guess.

The hard years on highway building, which is where he started, took their toll of the man. Battling the early road-construction problems, Perkins went for as long as 5 days and nights without leaving the job or taking off his clothes. That might be one of the reasons for his success today, and of course it may also be a contributory cause to a bad heart.

But Perkins has learned long ago to relax, to get work done without being excited, and to take all necessary precautions on a job to minimize worry.

Really the only thing Perkins worries about is the alarming loss of personal liberty in these United States. On this subject he gives his views with brilliant directness.

"We are blundering along like a man in a Model T," he explains. "Our headlights show us that the highway we travel is dark, dangerous, and slippery. We ignore these facts. The headlights flicker once in a while, but we plunge blindly on, trusting in some magic of government to keep them going.

"Each one of us ought to stop, to take stock, and do our utmost to get those lights fixed. We ought to get rid of the 'gimmes' and place ourselves in a job where taxes are being produced instead of spent. We've all got to produce more to make those headlights work, and to render the road less slippery.

"I sometimes believe it would be a good thing if the lights would go out temporarily. It might scare us enough to do something about the situation *now*. It would be a crisis, sure, but out of crisis comes heroic stuff that makes a nation great."

Just recently, government representatives have been informing Perkins of big-scale construction work ahead. Perhaps they too see in this ruddy-faced 6-foot extrovert a man who has a successful life, a fine appreciation of business relationships, and a whale of a personal philosophy, despite the note of pessimism in his general contemplation of life in these United States.

The Treasury Department is conducting an "Opportunity Drive" Savings Bond campaign. Take advantage of this opportunity. "Be a modern '49er and buy U. S. Savings Bonds."

and lower operating and maintenance costs

Now you can have an even better LPC Motor Scraper, improved at every point so you can be sure it will stay on the job continually — complete your job on schedule — and assure good profits!

Increase production and profits — with the new transmission, you can use *all* of the 225 H.P. to handle capacity loads, at top speeds, up and down grades, even in tough operating conditions. Figure the added profit at your own bid prices of one additional load per hour over 10,000 hours of operation. The new 32-amp. generator provides all the "juice" needed for 'round the clock operation. Bigger air compressor for greater air output and more intermittent compressor operation. Improved cable control unit and controls save valuable seconds — give accurate spreading control.

24:00 x 29 24-ply traction type tires—interchangeable front and rear. 21:00 x 29 also available.

Add these and other new and improved features to the original proven high production features and you'll see why LaPlant-Choate Motor Scrapers give you the lowest possible cost per yard — per hour — per day for the long life of the unit.

Ask your nearest LPC distributor to show you a Motor Scraper in operation and for the complete details of all the improvements which mean more profitable earthmoving for you. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa — 1022 77th Ave., Oakland, Calif.

HIGH SPEED EARTHMOVING EQUIPMENT

The Hydro-Lift shop crane features hydraulic operation and is said to lift a 2,000-pound load 77 inches in 37 seconds.

Hydraulic Shop Crane Has a 1-Ton Capacity

A hydraulically powered shop crane is announced by the Cardinal Corp., 1835 University Ave., St. Paul 4, Minn. The Hydro-Lift, as it is called, can be used on a 3-wheel floor frame, or can be quickly converted to use on a flat-bed truck or on a bench. It features hydraulic operation and will lift a load of 2,000 pounds to a height of 77 inches in 37 seconds, the manufacturer says.

The Hydro-Lift crane is equipped with a hand-operated double-acting hydraulic pump. It has a 45-inch boom, plus a telescoping 16-inch extension constructed of heavy steel. When it is mounted on a truck, the boom will swing through a complete circle; when on a shop frame, a special locator pin locks the crane in the proper working position. The boom is equipped with a hook for holding a chain sling.

Further information may be secured from the company, or by using the Request Card at page 16. Circle No. 114.

New Cylinder Lease Plan

A new leasing plan, designed especially for the small user of oxygen and acetylene cylinders, is announced by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y. Airco has teamed up a 122-foot-capacity oxygen cylinder with a 60-foot acetylene cylinder, and is offering them on a 25-year-lease period at a cost of $50 per pair. This 25-year period is the estimated life of the cylinders.

According to the company, any user holding a pair of cylinders three months or longer will benefit from the lease plan. The company's statisticians figure that leasing is more economical than buying, because the lease includes ordinary wear-and-tear repairs, periodic retesting, and inspection without cost to the lessor. When the cylinders are empty, they may be exchanged for a new pair of full ones.

The plan is said to provide three primary advantages. (1) Under average conditions, a welder who does both welding and cutting uses about twice as much oxygen as acetylene. Therefore, a 122-foot oxygen cylinder is teamed with a 60-foot acetylene cylinder to give the user the best possible gas ratio. (2) The smaller lighter cylinders are easier to move around the shop and, because of their portability, can be used anywhere. (3) A user saves a sizeable sum each year on demurrage charges alone.

Further information may be secured from the company, or by jotting down No. 129 on the Request Card at page 16.

Conveyor Division Formed

The Lake Shore Engineering Co., Iron Mountain, Mich., has formed a Conveyor Division to manufacture and sell Tote-All and Coaltoter lightweight power-driven portable belt conveyors for handling bulk and packaged materials. These machines were formerly manufactured by Material Movement Industries, Inc., Skokie, Ill., which has been dissolved. Distributors for the equipment will be unaffected by the change. Horton Conrad, President of MMI, has been appointed to direct the sales of the new conveyor division.

Curb and Gutter Forms

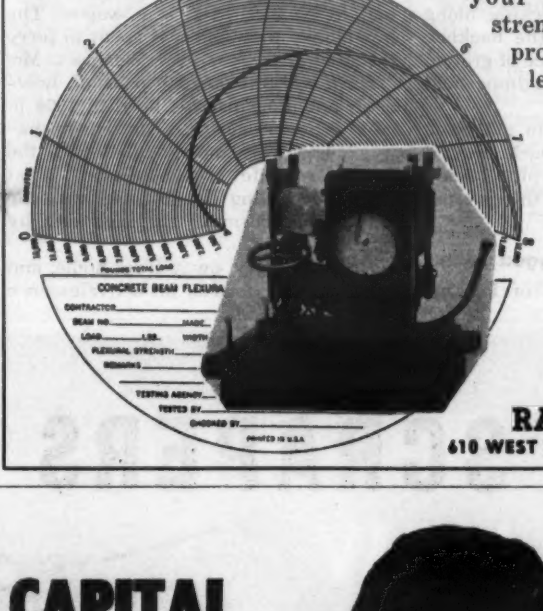
Bulletin No. 2259 released by the Blaw-Knox Division of Blaw-Knox Co., P. O. Box No. 2, Blawnox, Pa., deals with steel street forms. It is designed to help the reader select and use the proper paving forms for the construction of any type of concrete curb, curb and gutter, integral curb, special curb, or sidewalk.

Altogether, 16 types of forms, embodying a standardized and interrelated steel form system, are described and pictured. An illustrated guide also shows how to set and strip the forms in actual use.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 3.

A Major Advance in Concrete Control—

Model 415-UL **PORTABLE RECORDING BEAM BREAKER**



—offers irrefutable proof that your concrete flexural strength has been tested properly; with a shockless hydraulic load uniformly applied at the specified rate.

This improved model accurately records the entire loading cycle on an 8-inch-diameter chart. It soon pays for itself through improved controls and operating economies. WRITE:

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Low First Cost
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Today's cost-minded operators get a job done faster, make a dollar go further by using Barco Portable Gasoline Hammers. For any job of breaking, drilling, driving or tamping, the Barco cuts costs all around the clock. No need to tie up capital in big, seldom-used machines with high depreciation charges. Barco has a low first cost, is so usable you can keep it working all the time on one job after another. Barco is fast, easy to handle and carry—fuel and maintenance expense is extremely low. For more information write Barco Manufacturing Co., 1818 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.

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Anchor Holes Drilled At Rate of 42 a Day

Manitoba Power Commission Speeds Anchor Installation and Lowers Cost With New Compressor-Auger Team

By W. L. FERGUSON, Construction Superintendent, Manitoba Power Commission, Canada

✦ BY teaming a Le Roi Tractair air compressor and earth auger, the Manitoba Power Commission operates its Farm Electrification Program on a mechanized production-line basis. The program requires the installation of 15,000 anchors, and through the use of this equipment, anchor installation has been stepped up from 8 to 42 per day, and costs have been reduced $1.20 per anchor.

This project presented several problems, not the least of which was the digging of 15,000 anchor holes to the correct angle, to the proper depth, and at minimum cost. The process involves securing guy wires by driving a 6-foot rod through the ground to an 8-inch hole drilled at a 45-degree angle with the ground level. A plate 6 x 15 inches in size for clay and solid soil, or 8 x 24 inches for wet, sandy locations, is then hooked on the end of the rod to secure the guy wire.

Old Method

Formerly, a three-man crew supplied with 9-inch hand augers, a ½-ton pickup truck for transportation, and the necessary small tools, averaged 8 anchor and guy installations in an 8-hour day. At this rate, 16 crews working 20 days a month would have been required to complete the 15,000-anchor program. It was evident that to keep up with other phases of the job which are now largely mechanized, a machine would be needed which could dig anchor holes satisfactorily.

Various suppliers of earth-boring equipment were contacted and several designs were received and studied. The first thought had been an adaptation of the commercial farm post-hole auger, but most of these types were of too light construction, made simply for intermittent operation, or were not adaptable to drilling at an angle. The power-line post-hole diggers were prohibitive in price. After balancing ease of operation, invested cost, and sturdiness of each type, it was agreed to try an auger of new design.

New Equipment, New Method

The Manitoba Power Commission finally decided on a Ka-Mo air-operated auger mounted on a Le Roi Tractair combination 105 air compressor and 35-hp wheel-type tractor. On the back of this Tractair was mounted a Ka-Mo utility boom, 9 feet high, to support the 7½-foot auger and 74-pound air motor. The utility boom has a hand-operated winch for raising and lowering the auger. The design of the auger is such that in average Manitoba farm areas the weight of the air motor is sufficient to make the auger self-feeding. Stones and tree roots have some effect on the speed of the auger, but 3 to 4-inch stones are cleared with the earth, and roots up to 1½-inch diameter can be cut.

As the auger starts into the earth, the

(Concluded on next page)

Manitoba Power Commission Photos
This Le Roi Tractair compressor and Ka-Mo earth-auger team is drilling 42 anchor holes a day for the Farm Electrification Program of the Manitoba Power Commission.

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85% Guaranteed less shrinkage.

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ROADMIX MACHINES

MODEL 42
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WANT BETTER ROADS AT LOWER COSTS?

These machines produce a thorough complete mix in one pass at the lowest costs per ton. For mixing stabilized bases and wearing courses with any type of binder. Capacities from 100 to 350 tons per hour. Lowest initial cost and lowest upkeep cost, yet they produce the best quantity and quality.

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P-600 with Motor

PT-600 Tractor Powered

These machines pulverize the old asphalt wearing surfaces making it possible to reuse that select aggregate for base material or the new wearing surface. For soil blending work they have no equal.

Write for details

WOOD MANUFACTURING CO.

6900 Tujunga Avenue P. O. Box 620 North Hollywood, Calif.

Anchor Holes Drilled At Rate of 42 a Day

(*Continued from preceding page*)

winch line is let out so that the head of the auger can be held at the desired angle. When the hole has been sunk to the proper depth, the air motor is stopped and lifted by the winch just enough to clear the cutting edge. The motor is then restarted and the auger withdrawn, leaving a clean hole.

After a little practice, the two men required to operate this unit work as a team. They learn the amount of tension required on the winch line, the speed of the motor, and the position of the head of the auger, so that a minimum of effort is required. An additional three-man crew made up of a lineman and two groundmen follow this unit, drive the anchor rod, install and lock the plate, and hang the guy. A ½-ton truck is used to transport this latter crew and their tools and materials, which include the anchors, rods, plates, shields, guy wire, and clamps.

Results

Since this Tractair-earth-auger equipment has been used, production has averaged 42 anchor holes per working day. Farms in Manitoba are widely scattered, and considerable traveling is required before the feeder and farm tap-offs are completed. But the Tractair has a road speed of 12 mph and can be driven through ditches and quite rough terrain, so that practically all the required anchor locations can be reached. It has been calculated that the unit covers a distance of 28 miles per day.

On the average, 3 anchors are required per farm: this includes all anchoring on road allowances, corners, and farm taps in the area. The actual digging time is very small, usually 2 minutes per hole. Because of the long distance involved, the unit is not returned to a central point after work, but is left in a farmer's yard.

Costs

From experience gained with the mechanized anchor-hole drilling machinery, it is estimated that the installation cost is reduced by $1.20 per anchor over the former method of putting in the anchor. In calculating the cost, full allowance has been made for the labor of the operators, board and room costs, operating expenses, and deperciation of equipment.

Power Take-Off Unit

Because of the eased materials situation, split-shaft power take-off units have been returned to production by the Hercules Steel Products Corp., Galion, Ohio. These units are made in direct, offset, side, or dual-drive styles for long and short-wheelbase trucks.

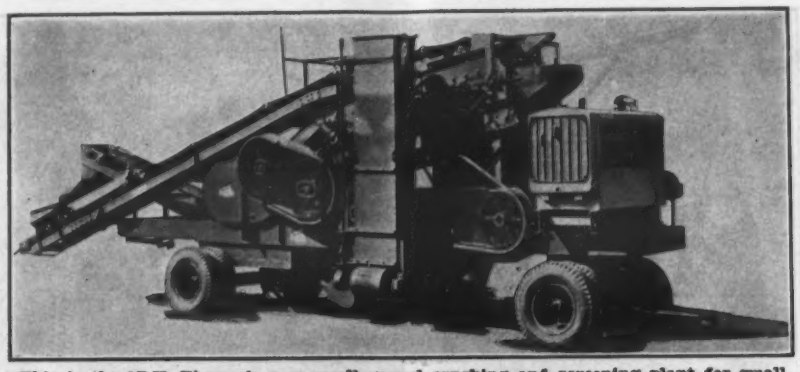
The Hercules split-shaft take-off units are designed to provide dependable transmission of the full horsepower and torque of the truck engine. They are recommended by the company for use in driving air compressors, electric welders, winches, pumps, rock crushers, concrete mixers, hammermills, drills, and other truck-mounted equipment.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 40.

Small Gravel Plant

A gravel crushing and screening plant for small construction projects, maintenance, and county work is announced by Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn. Designated as the 17-V, this plant incorporates all features of the larger Pioneer bottom-deck-feed plants. New features include a swivel-type feeder conveyor and a 12-foot 6-inch overall height.

All drives on the plant proper are either V-belt or tumbler shaft and gear box. The delivery conveyor folds at the side. The jaw crusher is 10 x 16 and the roller crusher, 24 x 16. A 30-inch x 8-foot 3½-deck vibrator screen is said to provide 40 square feet of effective screening area. The unit is mounted on a two-axle chassis and has four wheels on each axle. It uses 9:00 x 20 tires.



This is the 17-V, Pioneer's new small gravel crushing and screening plant for small construction jobs, maintenance, and county work.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 1.

B&D Transfers R. A. Lomas

R. A. Lomas, Service Engineer at the Seattle, Wash., branch of the Black & Decker Mfg. Co., has been transferred in the same capacity to the Los Angeles branch. G. S. Ellis has been promoted to Service Engineer at Seattle to fill the vacancy created by Mr. Lomas' transfer.

Land clearing—or any 'dozer work—is a pushover for International Diesel Crawlers. International diesels have the power and stamina to ram jobs through to completion at low cost and in minimum time.

International Power, geared to the ground by earth-grabbing tracks, puts maximum pull or push into the work for efficient earthmoving.

Get these International diesel advantages: advanced design fuel combustion, simplified fuel injection, positive all-weather starting, sensitive speed governing with torque control that increases engine torque as much as 15% when the load demands it, and the many other operating and construction features which International crawlers provide. They assure *superior performance, matchless operating economy* and *low maintenance;* benefits which spell PROFITS for International owners everywhere.

See *your* International Industrial Power Distributor or write for folder describing the International TD-18 Diesel Crawler.

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CRAWLER TRACTORS • WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS

Vibrating Screed Handles Large Slabs

Two operators can strike off concrete slabs 12 feet wide and 10 inches thick with the new gasoline-powered vibrating screed announced by the Stow Mfg. Co. of Binghamton, N. Y. Its use, the manufacturer claims, eliminates hand puddling and spading, and results in considerable savings in materials and labor.

The complete unit includes a 1½-hp Power-Pak with built-in vibrator, mounted on heavy brackets bolted to the beam. To absorb screed vibration vertically and horizontally, the base plate of the engine is mounted on four multi-plane vibration dampeners. End roller supports are attached at each end of the beam by standard rubber vibration dampeners. Vertical adjustment is provided so that the beam can be elevated out of contact with the side forms.

Two operators can strike off concrete slabs 12 feet wide and 10 inches thick with the new Stow gasoline-powered vibrating screed.

Four screed sizes are furnished, providing spans of 6, 8, 10, and 12 feet. All beams are 3 inches wide and have depths of 8, 10, and 12 inches. The Power-Pak, Stow reports, has stood up without damage under 200 test hours of continuous operation at more than 5,000 vpm. The Power-Pak alone is available if the contractor has his own beam.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 124.

Burning Equipment For Rotary Driers

Combination oil and gas burning equipment designed to save fuel and increase rotary-drier production is made by Hopkins' Volcanic Specialties, Alliance, Ohio. These burners are complete plants, with both hand and automatic control. They can be installed in as little as three hours, the manufacturer states, and are available in a variety of models and sizes to suit the size of shell and combustion chamber of any type of rotary drier.

Installations have saved up to 35 per cent on fuel, it is stated, by insuring complete combustion instead of allowing unburned fuel to escape up the stack as smoke.

Further information may be secured from the company. Or use the Request card at page 16. Circle No. 55.

Concrete-Beam Breaker Provides a Chart Record

Concrete control apparatus is described in a bulletin prepared by the Rainhart Co., 602 W. 34th St., Austin 21, Texas. The Model 415-UL portable recording beam breaker is designed to provide a permanent record of the entire loading cycle. It is for use in the field or in the laboratory.

The Rainhart bulletin contains a photograph of the unit and a specimen of the chart record showing how it outlines the loading against the time. The unit can be used to determine flexural strengths by the third-point loading system designated by the American Association of State Highway Officials and the American Society for Testing Materials; and by the center-point loading method, widely used by various State Highway Departments and others. According to the bulletin, a semi-skilled person can perform a complete test with an overall accuracy of within 1 per cent in approximately 3 minutes. The Model 415-UL is said to apply loads of up to 12,000 pounds, and has a capacity for handling beams of up to 6-5/16 x 6-5/16 x 40 inches. It has a shipping weight of 240 pounds.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 8.

Guardrails for Highways

Highway guardrails are described in an 8-page catalog issued by the Tuthill Spring Co., 760 Polk St., Chicago 7, Ill. The catalog stresses six features of the guardrail, including its strong shock-cushioning action, convex-shaped steel-plate rails, high visibility, easy erection, and others.

Specifications listed in the catalog for the Hyway Guard cover the rails, rail tensile strength, spring brackets, support bolts, rail bolts, posts, and weight of rails. Illustrations show how the guards are installed and their features of construction.

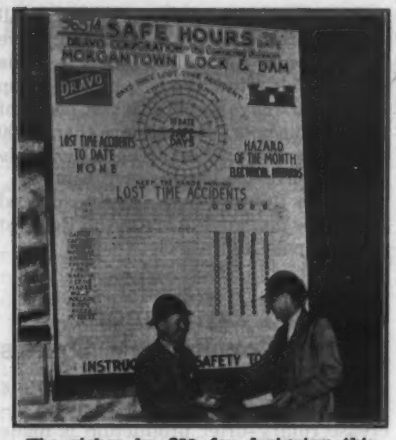
Two pages of the catalog discuss the Tuthill highway divider and the Tuthill guardrails for bridges. A series of photos shows what happens when two cars are about to collide on a road protected with the divider. Other photographs show the installation and construction of the bridge guardrails.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 54.

The International TD-18 Diesel Crawler, below, with matched bulldozer, clears stumps from land for a Seattle suburb. Its owner, W. H. Kamp of Des Moines, Washington, has worked this tractor for 4½ years without any trouble or repairs. It puts in seven day weeks of 24-hour days at long stretches. It has built as much as 7,000 feet of streets in twenty days, including opening and clearing land during extremely wet conditions, removing rocks as large as five tons and stumps of 10-ft. diameter. "The tractor is just as true today as a new machine," he says, "not sprung in the least and has never been off the tracks!" Quite a record for more than 10,000 hours of operation!

INTERNATIONAL HARVESTER

INTERNATIONAL INDUSTRIAL POWER



The richer by $50 for designing this safety sign, Charles D. Hodges (left), the Office Manager for Dravo Corp. on the Morgantown, West Virginia, lock and dam job, receives his award from Superintendent D. P. Childress.

Safety Sign Spurs Competitive Spirit

Job safety is brought home strikingly to workers on the Morgantown, W. Va., lock and dam job by a safety scoreboard which was put up by The Contracting Division of Dravo Corp. It was designed by Charles D. Hodges, Office Manager on the job.

Believing that safety is as much a mental process as a mechanical one, Mr. Hodges feels that the sign keeps workers alert to the need for protecting themselves—and other workers—from mishaps. It lists the total number of safe hours the job has progressed and the number of days without a lost-time accident. It lists the lost-time accidents by months and by foremen and in a special space it names the hazard of the month. It is displayed in a prominent spot and is credited with creating a competitive spirit between the various foremen and their crews.

The sign was submitted by Mr. Hodges in a company-sponsored suggestion-system program. The program calls for cash awards to employees whose ideas are adopted. The amount of the award is based on a percentage of estimated savings. Mr. Hodges received $50 for his design.

Salt Tablets

With summer suns in mind, the United States Safety Service Co., 1215 McGee St., Kansas City 6, Mo., has issued a new pamphlet on its line of Pep-Up salt tablets and the new Perma-San dispenser for outdoor use.

Pep-Up salt tablets, to protect workers in high temperatures and under the hot sun from heat fag and exhaustion, are enteric-coated to prevent nausea or salt sickness. This protective coating also keeps the tablets from disintegrating, crumbling, or melting, even under adverse weather conditions. They are available in bulk, for use in dispensers already on hand, or they may be obtained in dispensers. The new Perma-San stainless-steel unit to hold dispensers for outdoor use is made in two sizes with 500 and 1,500-tablet capacities.

The features of the tablets and the various types of dispensers are described in the new bulletin, which also explains the effects of heat fag and how salt tablets help to offset it, and lists some of the users of Pep-Up tablets.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 109.

New PCA Engineer, Omaha

C. W. Hiner, District Engineer of the Omaha Office of the Portland Cement Association for the past 8 years, and well known in engineering circles throughout the state of Nebraska, died suddenly at his home on April 11.

The vacancy created by his death has been filled by Harold G. Garner, formerly PCA paving engineer in the Topeka, Kans., area. Mr. Garner will direct Association field work in the entire state of Nebraska, under the general supervision of R. F. Dierking, West Central Regional Manager.

New Floor-Model Saw

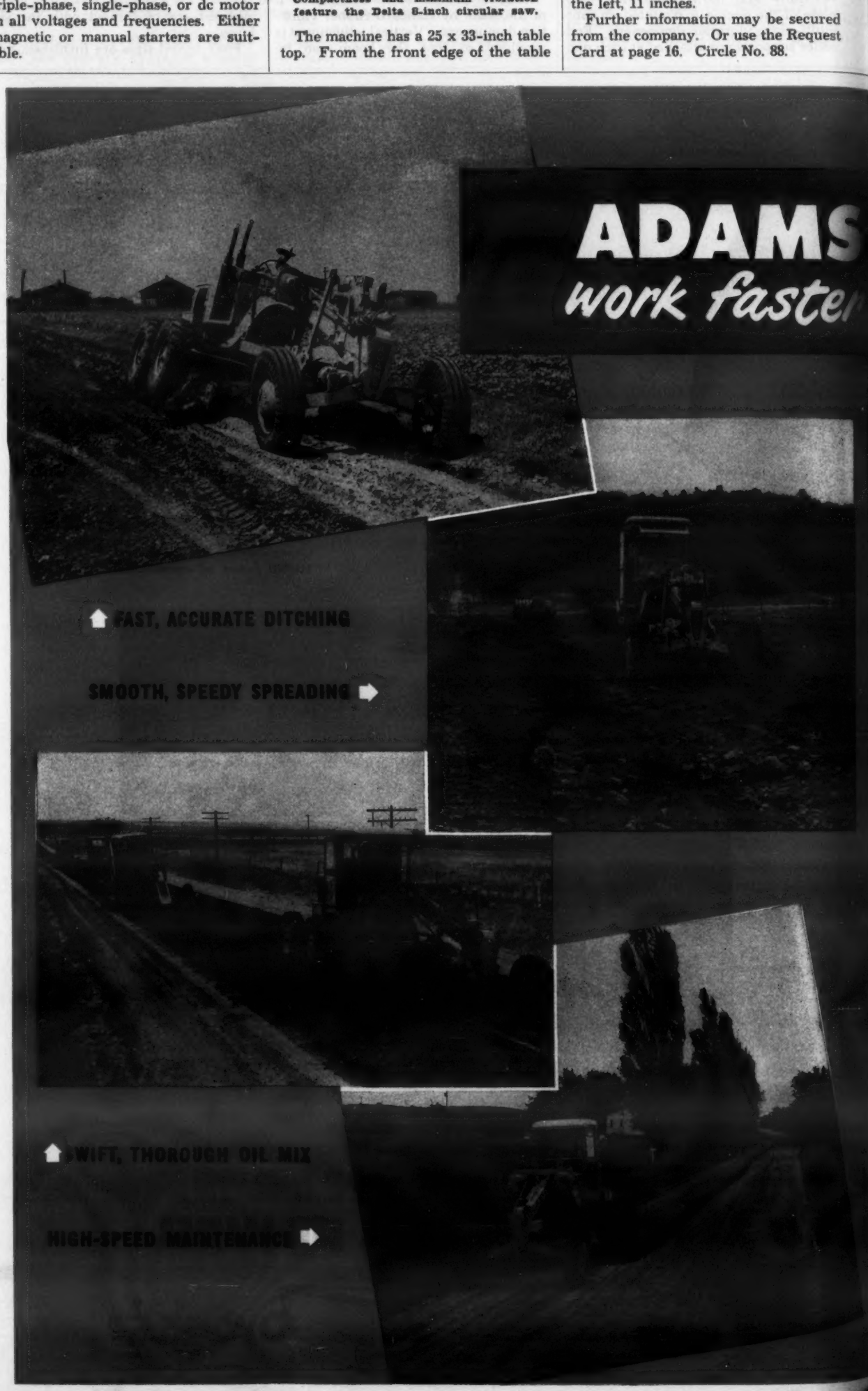
An 8-inch floor-model tilting-arbor circular saw is made by the Delta Mfg. Division, Rockwell Mfg. Co., 600 E. Vienna Ave., Milwaukee 1, Wis. The motor plate will take a motor with any frame, Delta reports, and the saw can be run by any standard ¾ or ½-hp triple-phase, single-phase, or dc motor in all voltages and frequencies. Either magnetic or manual starters are suitable.

Compactness and minimum vibration feature the Delta 8-inch circular saw.

The machine has a 25 x 33-inch table top. From the front edge of the table to the center of the blade the distance is 15⅝ inches. Table depth in front of the blade at maximum cut is 1 foot. The aluminum rip fence features a Micro-set mechanism, with separate front and rear clamping mechanism and pointer. Both faces of the rip fence are parallel.

The saw has a $2\frac{5}{16}$-inch-deep cutting capacity. The maximum cut, at 45-degree angle, is 1⅝ inches. Dado cuts up to $1\frac{3}{8}$ inch can be made. The miter gage is all metal and has adjustable indexed stops at 90 and 45 degrees, right or left. Stop rods, for production work, are standard equipment. Maximum rip to the right is 20 inches; to the left, 11 inches.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 88.



Tractor-Mounted Hoe

A ½-cubic-yard trench-hoe attachment is announced by the Hyster Co., 2902 Clackamas, Portland 8, Oreg. The Hoe Front is designed for use with the Models D7 and D8 Hystaway units. The manufacturer explains that it can be installed without major alterations to existing machines.

The Hyster Hoe Front has a dipper with a 33-inch cutting width; for narrow ditching, an optional dipper with a 23-inch cutting width can be substituted. The unit has a fast swing and an abundance of power for all classes of digging, Hyster reports. Its center of swing has been set beyond the crawlers to permit a long reach. The Hoe Front can be quickly interchanged with the various attachments made by Hyster, which include a dragline, clamshell, and crane.

The ½-yard Hoe Front has been added to the dragline, clamshell, and crane features of the Hystaway attachment for use with Caterpillar tractors.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 47.

Directs Asphalt Studies

Walter F. Winters has been appointed a District Engineer of The Asphalt Institute, with offices at 681 Grant St., Denver, Colo. He will be in charge, on a national level, of the Institute's special studies of asphalt as it relates to problems of reclamation and water and erosion control.

Mr. Winters was formerly Seattle District Engineer of the Washington State Highway Department.

This medium-weight Jackhamer, the Model J-40, is capable of drilling in any kind of rock, reports its manufacturer, the Ingersoll-Rand Co.

Medium-Weight Drill

A medium-weight rock drill is announced by the Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. The Model J-40 Jackhamer is similar in design to the heavier J-50, the company reports. It features powerful blows, strong rotation of drill steel, and plenty of hole-cleaning ability.

A double-kicker port valve is said to permit full air pressure on the piston for long periods of time. A specially designed auxiliary port allows full line air pressure to pass through the drill steel when the blower valve is opened, giving a strong blowing action for cleaning even deep holes. The throttle valve and the air-supply port are designed to allow air to be admitted gradually into the cylinder, making the collaring of holes easier.

The double-kicker port valve is made of wear-resistant material. The chuck driver is fitted with a replaceable bronze chuck nut which protects the piston flutes from checks and scoring in case a drill is allowed to run dry of lubricant. A renewable bronze bushing in the piston-stem bearing takes the wear from the piston stem and prevents scoring. A 3-in-1 backhead enables the machine to be quickly adjusted for wet, dry, or blower-type drilling. The J-40 was designed especially for use with Carset Jackbits.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 16.

Cast-Iron Pipe Fittings

Cast-iron pipe fittings in a wide range of styles and sizes are described in a catalog distributed by Russell Pipe & Foundry Co., Inc., P. O. Box 150, Anniston, Ala. The Russell line of equipment includes adapters, bell-and-flange pieces, bells and spigots, bends, three-bell blow-offs, caps, couplings, crosses, offsets, plugs, reducers, solid or split sleeves, tees, wall castings, wet-connection sleeves, and wyes. They are designed for use with cast-iron or asbestos-cement pipe.

The catalog begins with a general discussion of standard specifications for special castings; it treats markings, allowable variations in weight and diameter, quality and testing of materials used, cleaning and inspection, coating, etc. Then it lists the dimensions of each type of fitting in the Russell line, tabulating them under a cross-sectional drawing which indicates where each dimension is measured.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 12.

New Building for Schield

The Schield Bantam Co., Inc., has completed its new plant and office building. The new building provides double the former manufacturing floor space.

MOTOR GRADERS
... do more work per day

Action! Fast action! The kind that pays big dividends in time saved and work accomplished . . . that's exactly what you can expect, and what you get, with Adams Motor Graders on the job.

The reason: Adams 8 overlapping forward speeds provide instantly the *right* working speed for accomplishing each grading operation at the fastest practical rate. This is particularly important on such sustained-speed work as ditching, spreading, scarifying, oil mix and maintenance. And there's the big plus advantage of high job-to-job transport speeds—up to 25 mph.

Obviously, right working speeds do not alone insure efficient performance. There must also be rugged, dependable power; strong, rigid construction; balanced weight distribution; precision mechanical controls. You need them, one and all . . . and you get them all in Adams Motor Graders. Let your local Adams dealer show you the model best suited to your needs.

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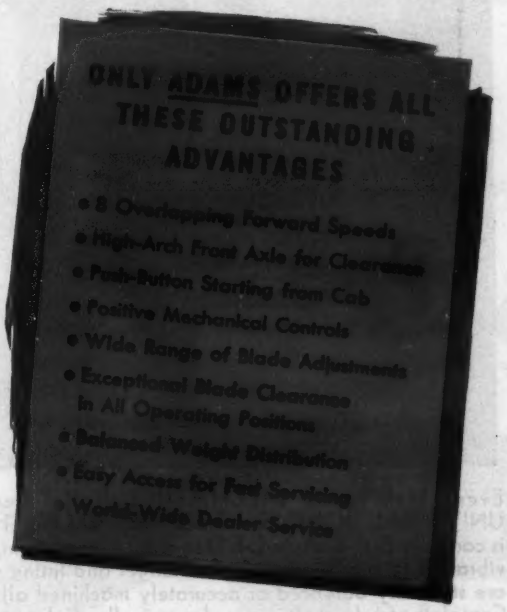
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Power Station Built In Sydney, Australia

Because of Built-Up Site, Mixed Concrete Is Pumped From Central Point; Steel Erection Well Under Way

By H. BOWDEN FLETCHER, D.F.C.,
Australian Correspondent for Universal Trade Press Syndicate

(*Photo on page 1*)

✦ TO cope with the increasing demand for electric power, the Sydney, Australia, County Council is erecting a power station at Pyrmont on the shores of Port Jackson. The plant, which will accommodate four 50,000-kw Metropolitan Vickers steam turbo-alternators, is being built at a total estimated cost of £12,000,000 ($40,000,000).

The project involves the construction of conduits for the circulation of water from the harbor, structural-steel and reinforced-concrete boiler and turbine houses, an auxiliary bay, buildings for the maintenance plant and storage of equipment, buildings for the unloading of coal and removal of ash, plus an extension to the 33,000-volt switch house belonging to the power station of about 37,000 kw which is already operating on the site.

The fact that work on the new station has had to be so organized that the existing station could be kept in operation all the time is, or course, interfering to some extent with the orderly progress of the construction work. But contracts have been let for the first stage of the program, which provides for installing two of the generators and constructing the buildings essential to house this section, in addition to the circulating-water intake conduit and outfall conduit. The first generator is scheduled for installation in the early part of 1950, with one to follow each year until all four generators have been installed.

In view of the urgency of the work and the shortage of skilled labor, the contractors for the civil works and generating-plant buildings, Messrs. Hornibrook, McKenzie, Clark Proprietary Ltd., are using every possible means to speed up the job. Among the most interesting of these means are a concrete-pumping plant with which it is hoped to deliver mixed concrete to every section of the job from a central point, and a 35-ton Lima crawler jib crane which is used to lift structural steel into position for the first 100 feet of height.

One of the problems facing the contractors was the very dense built-up nature of the site, which restricted movement of vehicles during the major period of concrete-lining work on the circulating-water conduits. This was one of the factors that more or less forced the adoption of the concrete-pumping method. In addition to going right under the foundations of the building area, the conduit also passes beneath a railway shunting area of 10 or 12 lines.

Conduit Excavation

Except for the shaft sunk on the site of the station, no additional ventilating shafts were required. But because of the nature of the ground, some sections of the conduits were excavated by the open-cut method. Where this was necessary, the rock was drilled by automatic drills and fired; and the material was lifted out by power shovels and loaded directly into the motor trucks for disposal.

For driving the underground tunnel, an Ingersoll-Rand JB-35 with automatic drifters was used, and fresh air for the workmen was supplied by fans through 12-inch canvas hose. The muck was loaded onto kibbles carried by trucks traveling on light rail tracks laid on the floor of the tunnel. When the trucks arrived at the shaft, the kibbles were lifted off the trucks by a mobile crane and the muck dumped into waiting trucks. The overall size of the tunnel is 15 feet 8 inches x 9 feet 2 inches, and the twin cells, which are 6½ x 7½ feet, are backed by 10 inches of concrete all around. In all, there are some 1,100 feet of new intake and 600

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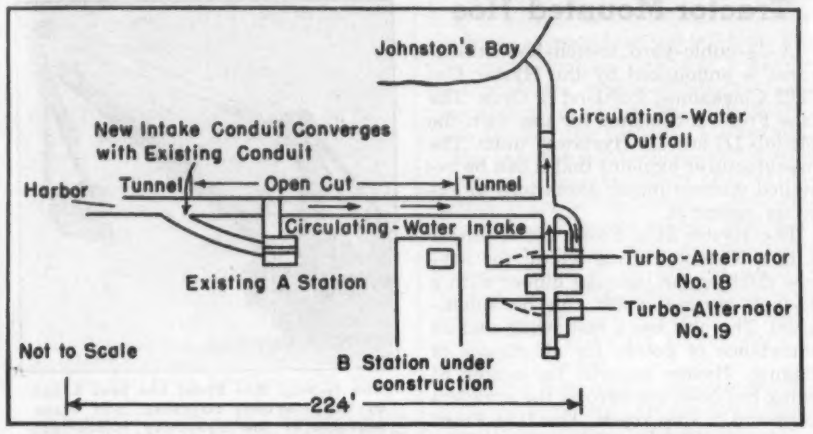

This field sketch shows the position of the existing power station and the new one for Sydney, the intake and outfall conduits, and the foundations for the first two turbo-alternators.

Every high speed MECHANICS Roller Bearing UNIVERSAL JOINT and Truck PROPELLER SHAFT is carefully B-A-L-A-N-C-E-D to reduce runout, whip and vibration to a minimum. Brake flanges and fitting yokes are statically balanced or accurately machined all over. Complete truck shafts are dynamically balanced, at high speeds, and factory tested to insure smooth operation. The scientific design of MECHANICS Roller Bearing UNIVERSAL JOINTS eliminates all useless, unbalanced weight. The original alignment and balance are not disturbed when replacing MECHANICS cross-and-bearing assemblies, because the bearings and pilots are accurately ground to insure absolute centering and perfect fit. Let our engineers show you how these MECHANICS advantages will benefit your product.

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feet of outfall conduit, and this part of the work is well advanced.

The fact that the existing A Station must be kept operating during the construction of the new B Station has not helped the general job routine. It will involve the use of a portion of the new outfall and intake conduits as a source of circulating water for the old station while the existing conduits are being modified to suit the new circulating-water requirements.

The outfall from A Station has been diverted to permit the construction of the new intake below it. The intake to the existing station will be sealed off with a cofferdam of steel sheet piling; the intake will then be enlarged and lined to serve both old and new stations.

Work on the new intake tunnel must be held up temporarily until the arrangements just outlined have been completed, because the line of drive converges at an angle of 15 degrees with the existing unlined conduit for the A Station.

Concrete Batch Plant

To assist with the concreting work, a mixing and batching plant has been erected adjoining the roadway so that delivery of aggregate and cement can be made at road level on the western side of the location. The road is actually 20 feet above the level of the site, and the location of the plant thus permits delivery of cement and aggregate without any interference with the construction work or any of the operations incidental to it.

The batch plant consists of two dumping hoppers of 20-ton capacity each, for sand and gravel respectively, placed behind a six-compartment storage bin. Each of the six compartments has a capacity of 25 tons and thus gives a total storage of 150 tons. Between the hoppers is a 60-foot vertical bucket elevator to lift the aggregates to the storage bins. Cement is handled by bag and chute directly to the mixer. Batch weighing is done by a Johnson 3-beam cumulative weigh batcher which discharges into two Armstrong-Holland 15-cubic-foot-capacity non-tilting mixers.

Coarse aggregates vary according to the specific job being done, but are chiefly 1-inch-round gravel with fine sand. For all hydraulic concrete the mix is 1:2:3, and for other types 1:2:4. The original specifications called for a 1:2:4 mix with 1½-inch blue metal, but this proved completely unsatisfactory for pumping. After many experiments, it was found that 1-inch-round gravel with a mixture of hill and river sand gave the best results. The sands were used in the proportion of 67 per cent hill and 33 per cent river, but at times this has been varied to 75 per cent hill and 25 per cent river sand.

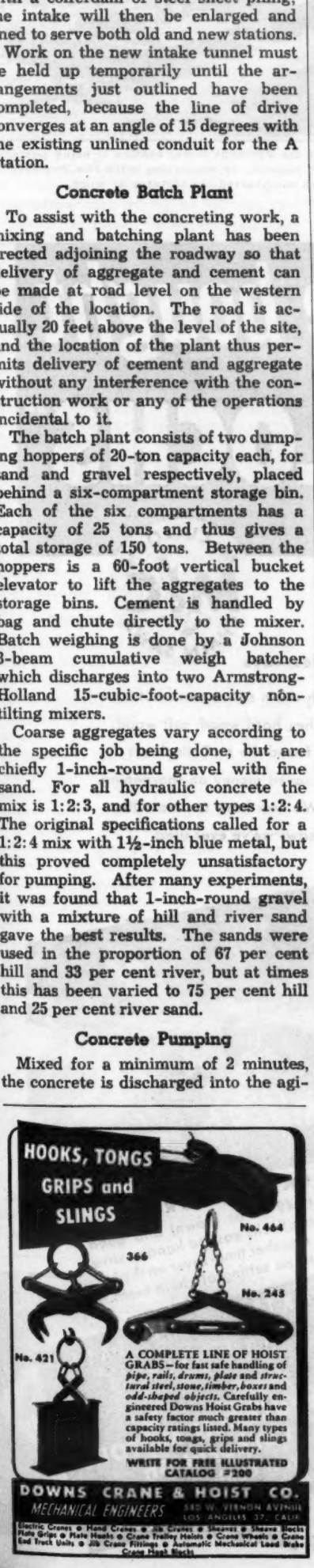
Concrete Pumping

Mixed for a minimum of 2 minutes, the concrete is discharged into the agitator or re-mix hopper of the pumping outfit, which has a capacity of 1⅔ cubic yards. Five paddles mounted on a trunnion handle the agitation. The pump is a PC3 Pumperete supplied by the Concrete Pump Co. of England. One feature of this method of handling the concrete is the small labor force required: one man on the elevator, one on the batcher, two on the cement chutes, one mixer driver, and one on the Pumperete when the pour is in excess of 100 cubic yards. When smaller quantities are being dealt with, the elevator man is not required and can be employed elsewhere.

The concrete pump, which is driven by an electric motor, is of conventional design and the pumping action is created by the movement of a piston. The valves are large plug cocks mechanically opened and shut to the movement of the piston. On the suction stroke the concrete enters through the inlet valve and completely fills it. At the end of the suction stroke the

(*Continued on next page*)

This is the concrete and steel foundation block for the No. 18 turbo-alternator at the new Sydney power house. In the center openings will go the condensers, on the right-hand block the turbine, and the left-hand block the alternator.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DRAGLINE BUCKETS AND MFG. PLANT
BATON ROUGE, LA.
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Here, concrete for the turbine foundations of the Pyrmont power station is being pumped to the pouring site via pipe line. Above is a close-up of concreting with the Pumperete plant. Note the bell mouth and the compressed-air agitator at work.

Power Station Built In Sydney, Australia

(*Continued from preceding page*)

inlet valve closes and the outlet valve opens. On the pressure stroke the concrete is forced into the pipe line.

To keep the sharp edge of the valve from shearing through pieces of coarse aggregate, the valves are never completely closed; they remain open a varying amount according to the size of the metal being used.

The concrete-distributing pipe line is of mild steel and has a 6-inch inside diameter. Sections, which are joined with lugs and wedges, are in standard lengths of 2, 3, 4, 5, 9, and 10 feet, used in conjunction with 22½, 45, and 90-degree bends. In some of the tougher spots where rigid bends or pipe line are not suitable or are difficult to use, a flexible 8-foot 1¼-inch length is used.

Before concreting is commenced, water is passed through the line and removed by a go-devil under compressed air. Then a 1 to 3 grout—the actual consistency depending on the pumping length—is passed into the Pumperete to lubricate the valves and line.

The pipe line is made fast to portions of the structural-steel work already erected, and raised to such levels as will insure a correct head for the pump. In the tunnel inverts and when fairly high lifts mean pumping on stiff grades, a 2-foot guillotine section is inserted in

(*Continued on next page*)

6 Cu. ft. capacity PLASTER and MORTAR MIXER . . .

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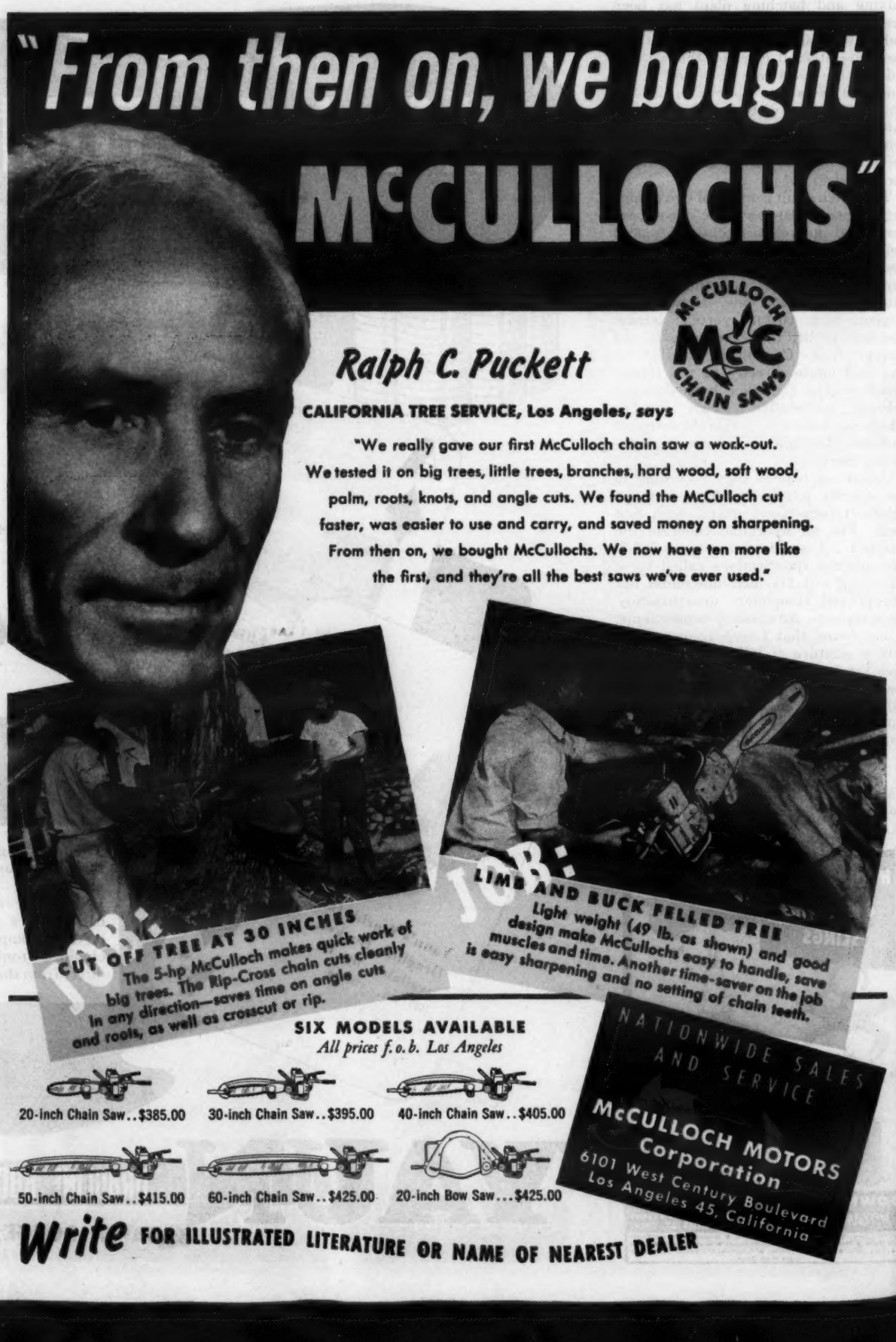
Tilters, Non-Tilters, Plaster Mixers, Concrete Carts, Mortar Boxes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McCULLOCH MC CHAIN SAWS
Ralph C. Puckett
CALIFORNIA TREE SERVICE, Los Angeles, says
"We really gave our first McCulloch chain saw a work-out. We tested it on big trees, little trees, branches, hard wood, soft wood, palm, roots, knots, and angle cuts. We found the McCulloch cut faster, was easier to use and carry, and saved money on sharpening. From then on, we bought McCullochs. We now have ten more like the first, and they're all the best saws we've ever used."
JOB: CUT OFF TREE AT 30 INCHES
The 5-hp McCulloch makes quick work of big trees. The Rip-Cross chain cuts cleanly in any direction—saves time on angle cuts and roots, as well as crosscut or rip.
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40-inch Chain Saw..$405.00
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60-inch Chain Saw..$425.00
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the line to control flow each way by setting up back pressure. When vertical drops are being used, a breathing cock is also placed on the top elbow to prevent trapped air from being compressed and causing surging. The cock remains open until friction in the horizontal run of the pipe at the bottom of the drop exerts enough resistance to balance the head and completely fill the drop pipe.

After the bottom of the tunnel has been concreted, and the twin forms for the cells placed, the concrete for the walls is laid by means of a special jumbo, on wheels, mounting three pipe slicks joined by flexible lengths to a common supply line. By pumping through the three slicks alternately, it is possible to maintain an even pressure of concrete around the forms.

Pouring is generally handled by working back from the original distributing point, breaking off 5-foot sections of the pipe line as the pour progresses. At the point of distribution the pipe must be set at a height which will chute the concrete over the whole of the lateral area through a bell mouth. Allowance is made, when the pour is finished, for the concrete still in the pipe line; this is averaged at 0.065 cubic yard for each 100 feet of line, and to this is added the amount in the re-mix hopper and in the plant—or in all, about 3 cubic yards.

The pipe line is cleaned after each pour by driving a go-devil, composed of half a dozen wet bags, through the line under compressed air. Communication between the operator of the Pumperete and the foreman is by field telephone.

All concrete work—whether for plant foundations, tunnel-invert walls and roof, floors, of buildings, or the main frameworks of the buildings—is being done by the pump method. It is anticipated that 30,000 cubic yards will be required to complete the job at present being handled by the contractors.

Structural-Steel Work

For erection of the structural-steel work, an 802-B Lima crawler crane of 35-ton capacity is used with a heavy 65-foot working beam and a second one composed of center sections giving 85, 105, and 125-foot lengths. A 10-foot gooseneck on top gives a maximum lift of 125 feet from the ground level. This combination of lifts permits the steel erection to be carefully planned so that the crane can be gradually withdrawn from the building area as the limits of its usefulness are reached. This has been one of the major problems, as the site must remain open for general excavation right through the erection program.

As the lifting height of the Lima is exceeded, the unit is being used to erect, on the completed steel framework, a brace of stifflegs to carry on the higher lifts beyond its range. These cranes, designed and built in the workshops of the contractors, will have a maximum boom length of 110 feet and a lifting capacity of 15 tons. The first of these has already been erected and is operating.

Other Work in Progress

Foundations for the first two turbines are nearly complete and the base of each is located about 30 feet below ground level in solid sandstone. Some 10½ tons of reinforcing steel are used for each of the foundations, which measure 88 x 26 feet, while some 500 cubic yards of concrete are used below ground and the same quantity above ground level.

Foundations for the turbo-alternators at the new Sydney power station are nearly complete, and steel work for the turbine house is being erected. A portion of the runway for the two cranes which will traverse the turbine house is shown here in position.

Work on the boiler and turbine house, venturi tunnel, etc., is proceeding steadily, and the steel framework of the boiler house has advanced sufficiently for the installation of one of the two boilers, which are each of 430,000-pound maximum continuous rating at a steam pressure of 1,250 psi and a temperature of 950 degrees F. The boilers will be fired with pulverized coal and are being supplied by International Combustion Australasia Proprietary Ltd.

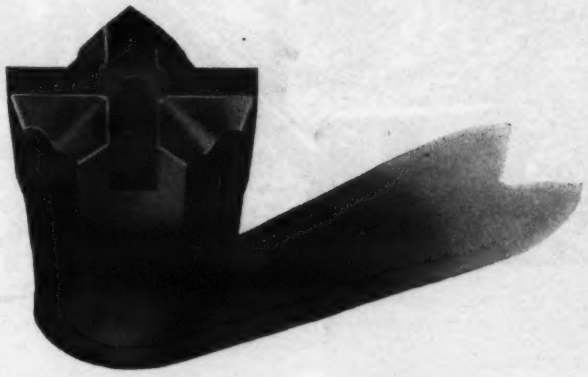
The 30-foot suction pit has been completed and is almost ready for the installation of the pumps. And initial work has commenced—testing for foundations—on the construction of the dock in Blackwattle Bay for the use of barges which will dispose of the plant's ash and

(*Concluded on next page*)

For Over 70 Years Builders of Fine
WHEEL BARROWS:
AMERICAN
STEEL SCRAPER CO.
Sidney, Ohio

Carset Jackbits

Reduce air consumption at least 40%
Reduce drill maintenance as much as 30%
Save up to 30% on dynamite



HERE ARE A FEW TYPICAL REPORTS ON CARSET PERFORMANCE

ON A LARGE QUARRY JOB, drilling in hard trap rock with 45-lb. Jackhamers, steel bits dulled so quickly that they required 4 to 6 bits for a 2-ft. change—also the strain of forcing dulled bits caused excessive rod breakage. CARSET JACKBITS, now being used, are averaging 300 feet per bit. Rod life has been greatly increased and drill maintenance materially reduced.

ON A LARGE DAM PROJECT, 2" CARSET JACKBITS were used with 4" Wagon drills operating in hard dense basalt. These bits drilled 24-ft. holes in 22 minutes, while steel bits previously used required 66 minutes for an 18-ft. hole (with 10 bit changes). Footage was increased from 120 to 261 feet per shift. The contractor says "If I'd had CARSET JACKBITS at the beginning of the job, I'd have saved $75,000 to $100,000."

IN DRILLING LARGE BOULDERS, for blasting in an open pit operation, Jackhamer operators increased drilling speed from 4 inches per minute with steel bits to 10 inches per minute with CARSET JACKBITS. This combination of higher drilling speed and the saving of time previously lost changing bits, permitted them to complete 60% more plug holes per day.

A MINING COMPANY, drove 223 feet of 8 x 8 cross-cut in typical siliceous rock with 3" drifters and 1½" CARSET JACKBITS. Eighteen bits were used, averaging over 300 feet per bit. By drilling small uniform diameter holes with CARSET JACKBITS, they saved 8 pounds of dynamite per foot of advance, or total of $223.—which more than paid for the cost of the CARSET JACKBITS!

These and many more are the proved advantages of I-R CARSET JACKBITS

The performance and economy of Ingersoll-Rand's revolutionary CARSET JACKBIT are now a matter of record—proved by more than two years of actual field experience on all types of mining, quarrying and construction jobs.

This super-Jackbit set with Carboloy inserts, drills from 50 to 400 times as many feet of hole as the best steel bits available—with no appreciable gauge wear! It permits drilling of smaller, uniform-diameter holes to any practical depth, without binding and without bit changes. The elimination of tapered holes saves up to 30% on dynamite alone. And because it drills so much faster and easier, even in the hardest rock, the CARSET JACKBIT reduces air consumption per foot of hole 40% or more, and saves as much as 30% on drill maintenance. No wonder rock-drill men call it "The greatest single advance in rock drilling since the invention of the Jackhamer."

For the complete story on the CARSET JACKBIT, write today for your copy of our new 36-page, pocket-size catalog, Form 4091.

CARSET JACKBIT
SET WITH CARBOLOY INSERTS

manufactured exclusively by

Ingersoll-Rand

412-15 11 BROADWAY, NEW YORK 4, N. Y.

Power Station Built In Sydney, Australia

(*Continued from preceding page*)

dust. For this work two hopper barges of 200 tons each are on order.

Among the equipment being used on the job, other than that already mentioned, are a 10-ton Bay City mobile crane for general lifting work, two Broomwade compressors of 750-cfm total capacity, one Ingersoll-Rand 250-cfm compressor to provide the general air supply, one Caterpillar tractor with dozer attached for general leveling work, power shovels for lifting excavated material, power drifters, vibrators, and sump pumps.

The 50,000-kw steam turbo-alternators will generate at 33,000 volts at a steam pressure of 1,200 psi at a temperature of 925 degrees F, and will operate at a speed of 3,000 rpm. The heaviest turbine casting will weigh 20 tons and the heaviest rotor about 22 tons.

The block of land on which the power station is being erected is not one of even dimensions, since one end is much wider than the other. But the measurements are 600 feet long by an average width of 300 feet.

Engineer in Charge

The engineer in charge of civil construction work for Hornibrook, McKenzie, Clark Proprietary Ltd. is an American, Col. George W. Noe of Billings, Mont., who served in the southwest Pacific with the Engineer Corps of the U. S. Army, and then decided to make his home in Australia.

Road Work Lags Despite Record 1948 Expenditures

More money was spent on highway construction in 1948—with fewer results—than in any pre-war year since 1924, with the exception of 1935. This statement is based on a National Industrial Conference Board study using U. S. Department of Commerce figures. They show that expenditures in 1948 totaled $1,540,000,000, but based on the 1939 dollar, the country obtained only $682,000,000 worth of highway construction. This points up the need for raising the country's sights in the so-far losing battle to provide roads commensurate with population and traffic increase.

Charles M. Upham, Engineer-Director, American Road Builders' Association, in commenting on this situation, said: "Even in the depression years, when the highway program suffered a sharp decline and partial recovery, the average volume of highway work accomplished was higher than that done in any year since the war. The figures also reveal that in terms of actual amount of work done, the post-war highway program, theoretically supposed to take care of the increased traffic — 10,000,000 additional vehicles registered since war's end—and our increasing population — 25,000,000 since 1930—has not yet equalled that of the immediate pre-war years. . . .

"For example, it is of no use to marvel at the fact that in the three years since World War II we have spent $3,545,000,000 on highways, when the amount of highway construction done in terms of 1939 dollars amounted only to about one-half of this, or $1,768,000,000."

It is clear, Mr. Upham said, that we must proceed at once with a stepped-up highway program to accommodate our growing population and the increased number of motor vehicles.

Water Tank, Cup Dispenser

A portable drinking-water tank with a paper-cup dispenser attached is described in a bulletin issued by the Paper Cup Division of the U. S. Envelope Co., 68 Prescott St., Worcester 5, Mass. The bulletin shows a front and rear view of the dispenser, and a picture of it being carried and used in the field.

The container has a capacity of 5 gallons and an empty weight of 12 pounds. It is 17¼ inches high, 14 inches wide, and 10⅞ inches deep. The steel dispenser holds 300 Ajax cups, which are made in three sizes: the No. 4 with a capacity of 4¼ ounces; the No. 575, 5¾ ounces; and the No. 725, 7¼ ounces.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 53.

Two Hyster Appointments

Jack A. Cairns has been transferred to a sales engineering position in the Los Angeles area of the Hyster Co. He was formerly Assistant to the Western Division Sales Manager. Named as District Manager of industrial truck sales for the Western Division is William Kilkenny, who will cover eleven western states, four western provinces of Canada, and Alaska and Hawaii.

HOW MUCH DOES IT COST YOU

...when a tension bolt breaks?

TIME LOST IS MONEY LOST . . .

and when you're on a tough schedule, a broken track tension bolt can tie you up anywhere from 6 to 8 hours. Don't take a chance with losses like this—keep a QUICK-ON Emergency Cap Tension Bolt on every Cat. Simple installation *right on the job*—gets you going again in 30 minutes. Retails for only $12.50 . . . an insignificant cost when you consider the big saving in *time* and *money*. Order QUICK-ON Emergency Cap Tension Bolts today for all of your D8's . . . see your dealer or write us direct.

SILVER BOOSTER MFG. CO.
812 So. Flower St., Burbank, Calif.

TWO BIG REASONS for Keeping a Quick-On Emergency Cap Tension Bolt on Every Cat

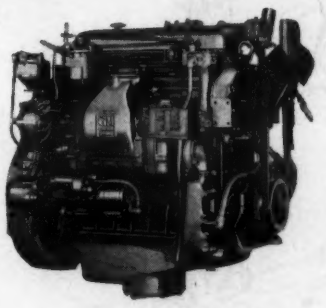
1. Installed on the job in 30 minutes . . . minimum equipment lay-up.
2. Retails for only $12.50 . . . Compare this with an average cost of an 8 to 10 hour breakdown, when the unfortunate happens and a tension bolt breaks.

Patent Pending

QUICK-ON Emergency Cap Tension Bolt

"They don't come any better-"

Says Master Mechanic Ralph Stinson of Missouri Valley Construction Co.



MEN who really know—men, like Ralph Stinson, who have seen General Motors Series 71 Diesels at work—offer proof of their performance: "They hold up better and are easier to maintain than any other Diesel engine in the same horsepower range. They don't come any better," Mr. Stinson says. And he cites his records to back up his statement:

In the summer of 1946, Missouri Valley Construction Co. replaced three 3-ton dump trucks with a pair of Koehring Dumptors, powered by GM 4-71 Diesels. Since then, the two units, now quarrying limestone at Warren, Mont., have tripled production with lower fuel costs. Maintenance has been considerably lower too, Mr. Stinson reports.

General Motors Series 71 Diesel engines are designed to produce more power at lower cost. Their sturdy two-cycle operation delivers power at every piston downstroke—smooth, dependable power that responds instantly to varying load demands. They're sensible in size and weight, and compact construction makes them easy to install. Simplified design makes service and maintenance much easier.

All these features combine to make your operation easier and more profitable. It will pay you to investigate the possibilities. Get the complete story from your nearest distributor or write to us.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES . . Up to 300 H.P. DETROIT 28, MICHIGAN MULTIPLE UNITS . . Up to 800 H.P.

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

Brush, fallen trees, and shrubbery are reduced to chips for easy disposal—or for use as mulch—by the M & M Brush Hog.

Machine Cuts Up Brush, Trees, Shrubs

A new development for use in clearing and grubbing operations as well as in roadside clearing, tree trimming, and brush and shrub removal to improve sight distance, is the M & M Brush Hog. This unit, made by Mitts & Merrill, Inc., Saginaw, Mich., is designed to reduce tree branches, fallen timber, shrubbery, and brush to chips. In this form, they are easily disposed of, or the chips may be used as mulch by farmers or in roadside work.

The Brush Hog is equipped with 24 revolving knives and 2 stationary bars. It is powered by an International gasoline engine, with power feed and V-belt drive. It is designed to handle from 5,000 to 6,000 pounds of brush per hour. Since it is readily portable, it may be towed behind a truck, taken from job to job, and thus provide a means of cutting up brush or trees wherever they lie.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 103.

Oil-Hydraulic Valves

Control valves for use with hydraulic equipment are manufactured by the Hydraulic Equipment Co., 1100 E. 222nd St., Cleveland 17, Ohio. Among the features claimed for the Hydreco line are the patented hollow plunger design with built-in checks said to assure positive stops and starts when moving the load; circular orifices in the hollow plunger which permit smooth starting and careful throttling; plunger bores honed to assure perfect fit; and built-in relief valves.

Items in the Hydreco line include a 1-plunger V1 Type B control valve with a 14-gpm capacity; a 4-plunger V4 Type C control valve with a 25-gpm capacity; a VB control valve especially designed for use with bulldozers, loaders, or other equipment requiring up and down pressure and hold or float positions; and the VP propelling valve for use with hydraulic motors.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 48.

Lightweight Generators

Lightweight gasoline-engine-driven electric generators are described in a 12-page catalog issued by the Homelite Corp., 71 Riverdale Ave., Port Chester, N. Y. Among the features claimed for the Homelite generators are constant voltage, overload capacity, dependability, weatherproofness, rugged design, and compactness.

Photographs and text show many applications for these generators and explain their various features. Cut-away drawings illustrate the structural details of the generators, which are available in units rated at from 500 to 5,000 watts and weighing from 57 to 178 pounds. Catalog L-408 lists six major types of Homelite generators, including 115-volt 60-cycle single-phase; 120-volt compound wound; 115/230-volt 60-cycle single-phase ac; 230-volt 180-cycle 3-phase ac or 110-volt dc; battery-charging generators for 6 to 16 volts dc; and special generators.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 111.

Combination Loader

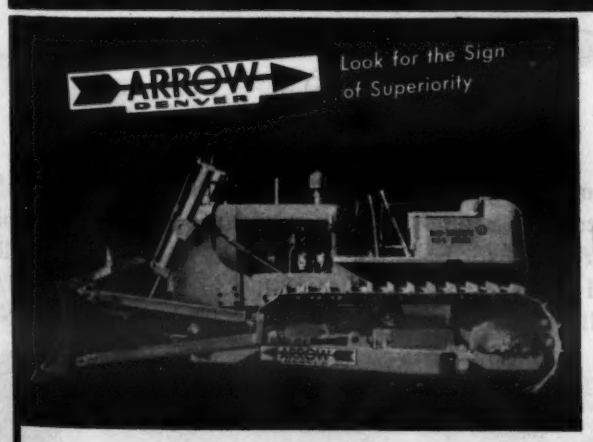
A combination loader, carrier, and motor truck is a new product announced by the Lull Mfg. Co., 3612 E. 44th St., Minneapolis 6, Minn. The Traveloader is designed to pick up a load from the side, place it on its carrying deck, and transport it to the desired location at speeds up to 30 mph.

The Traveloader is made in three models with lifting capacities of 3,000, 10,000, and 30,000 pounds. Among the features claimed for this material-handling device are 4-wheel drive, full hydraulic control, and full-power hydraulic loader operation.

A loader, carrier, and motor truck all in one—the Lull Travsloader. It self-loads from the side and then transports the load on its carrying deck at speeds up to 30 mph.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 63.

DOZERS for ANY Tractor



BULL OR ANGLE DOZERS

• CABLE or HYDRAULIC

PRICE? CHECK ARROW'S! No matter whether you have a CURRENT or NON-CURRENT ALLIS-CHALMERS—INTERNATIONAL—CLETRAC—or CATERPILLAR tractor, you can get an ARROW BULL or ANGLE DOZER TO FIT IT. Guaranteed top quality construction. Speedy delivery. Get complete details and prices TODAY. See Your ALLIS-CHALMERS Dealer

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P. O. Box 4120 South Denver Station • Denver, Colorado

Galion Performance Pays Off!

ENGINEERED TO EXCEL

GALION 3-Wheel, Tandem, and Portable Rollers have the built-in stamina and advanced features that result in top performance.

Write for complete information on the type of roller in which you are interested.

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ESTABLISHED 1907
GRADERS • ROLLERS

THE GALION IRON WORKS & MFG. CO.
General and Export Offices – Galion, Ohio, U.S.A.
Cable address: GALIONIRON, Galion, Ohio

Translucent Glazing For Contractors' Use

A plastic glazing with several applications in the contracting field is manufactured by the Celanese Corp. of America, 180 Madison Ave., New York 16, N. Y. Vimlite is designed to permit the transmission of a diffused light while acting as a barrier against bad weather. For this reason, it is recommended by the manufacturer for temporary enclosures, for temporary windows, as a semi-opaque partition, and other uses.

Vimlite can be cut to size with shears or snips, and tacked or stapled into place. It will not stretch or sag or pull frames out of shape, says the company, and it can be painted, bent into shape, and otherwise fabricated. It is sold in 28 and 36-inch wide rolls, in lengths of 25, 50, and 100 feet.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 15.

Filler for Fuel Tank Is Vacuum-Operated

An automatic device for filling fuel tanks on construction equipment is manufactured by The Fill-A-Matic Co., 817 W. Market St., Louisville 2, Ky. According to the manufacturer, this unit is not a pump, but an automatic device which uses the suction of the engine to draw the fuel into the tank, and shuts off automatically when the tank is full.

The Fill-A-Matic refueler utilizes the suction of the pistons to create a vacuum in the fuel tank. This is accomplished by a copper tube connected to the intake manifold and leading to an automatic-type needle-point valve located on the inside of the fuel-tank bulkhead. With the engine operating at idling speed, the Fill-A-Matic is designed to fill the tank at a rate of from 5 to 6 gpm.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 57.

Truck-Type Crane Carrier

A descriptive bulletin on the Model 83-CC crane carrier has been released by The Byers Machine Co., Ravenna, Ohio. The Model 83-CC is an independently powered 35-mph truck-type chassis upon which is mounted a heavy-duty ¾-cubic-yard upper deck capable of lifting crane loads of up to 20 tons. It is convertible to all front-end attachments.

Specifications listed cover the wheelbase, width, frame, engine, clutch, transmission, propeller shaft, steering gear and wheel, front and rear axles, brakes, springs, wheels and tires, cab, and standard equipment. Engineering data cover the crane-lifting capacity of the 83-CC with a 30, 40, 50, or 60-foot boom, used with or without outriggers, and working at various radii. This table is accompanied by notes on crane booms and capacities, a table of overall dimensions, and a list of maximum capacities of single, 2, 3, 4, and 6-part lines.

Individual features of the carrier illustrated and described in the bulletin include the four sliding outriggers, the hinged crane boom, and the oversize roller path with four hook rollers. The crane boom is also described in detail, as is the truck type of mobility offered by the Model 83-CC crane carrier.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 70.

Sump Pumps in Wide Range

Sump pumps for all purposes are described in a 16-page catalog prepared by Economy Pumps, Inc., Hamilton, Ohio. Catalog E-345 features a list of seven major advantages claimed for the Economy pumps, including a patented shock absorber to prevent deflection of the shaft when heavy objects enter the impeller, a screenless and non-clogging impeller, an adjustable shaft nut, shielded deep-groove ball bearings, and a deep stuffing box with an easily accessible stuffing gland.

The Economy pumps are made in single and duplex models in sizes from 3 and 4 inches to 6 inches and larger. The catalog contains information on each style in the line and uses cut-away photographs and cross-sectional drawings to illustrate construction and operation. Engineering data are presented on how to select a pump of the proper capacity, and how to determine the pressure head and the sump or basin size. A table gives capacity, pump size, and horsepower requirements for different types of service.

This literature may be obtained from the company, or by jotting down No. 130 on the Request Card at page 16.

Portable Batching Plants

Portable batch plants for use with 10-S, 14-S, and 16-S mixers are described in a 4-page folder prepared by the Winslow Scale Co., 25th and Haythorne, Terre Haute, Ind. The Binanbatch units are equipped with either two or three storage bins, a weigh hopper, and a batching scale. The catalog describes several features claimed for the Binanbatch units, including the scale equipment and leveling device, the loading of the bins, dismantling for truck transportation, and others. Specifications cover the bin capacity, dimensions assembled and dismantled, and the operation of the weigh hopper. Photographs show the Winslow units in use on a bridge job; with the weigh hopper in position to receive material from the bin; dismantled and loaded on a truck, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 19.

HD-5 TRA
HD-5 TRACTOR with
its interchangeable attach
standard bucket, ¾ cu.
2 cu. yd. snow loader bu
bucket, bucket teeth,
blades, V-type snowplo
Wrap up
YOUR YEAR 'ROUND PROBLEMS with t
EQUIPMENT PACKA
Reduce your equipment investment with this equipment package. No need to have a number of specialized machines for various jobs. Any maintenance work . . . and much of your construction . . . material handling . . . snow removal and loading are quickly,
done with this versatile combi
BIG SAVINGS. Let your Allis
dealer tell you all about this LO
BUDGET STRETCHING PLAN.

New Weed Killer For Brush Control

A commercial weed killer called Estercide-T 245 has been developed by the California Spray-Chemical Corp., Richmond, Calif. It is based on 2,4,5-T—"isopropyl ester of 2,4,5-T trichlorophenoxyacetic acid", as the chemists say—which is a close cousin of the well known 2,4-D but which is claimed to give better control of brush plants, blackberries, poison oak, willows, and many other woody perennials.

Estercide-T 245 mixes readily with water or oil, the company reports, and can be used in combinations with 2,4-D where desirable. It is adaptable for airplane or helicopter application where extensive acreage is involved.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 20.

Liner Plates for Tunnels

"Tunneling for Profit and Convenience" is the title of a 4-page folder put out by Armco Drainage & Metal Products, Inc., Middletown, Ohio. The catalog points out how lightweight corrugated liner plates simplify the construction of tunnels, how they require less excavation, how rapidly they are erected, and other features. It pictures four typical installations of Armco liner plates for constructing sewers under highways, railroads, or city streets; for constructing underground utility lines; for relining failed sewers, culverts, or underpasses; and for constructing pedestrian or utility underpasses.

The Armco tunnel liner plates are made in gages ranging from 14 to 3. The 4-page catalog tabulates their physical properties: area in square inches, section modulus per inch and per section, radius of gyration, and approximate weight—including bolts—for 12, 14, or 16-pi plate.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 91.

Lists Water Suction Hose

A new 4-page catalog section on water suction hose has just been issued by the B. F. Goodrich Co., Akron, Ohio. It pictures and describes each of the hose brands in the company's line, gives specifications on each, and lists recommended uses and conditions. Information on fittings used with the hose is also included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 72.

BD-3 MOTOR GRADER
BD-3 MOTOR GRADER, 78 brake h.p., 19,042 lbs. . . . or any other A-C diesel-powered model—AD-4, 104 brake h.p., 22,140 lbs.; AD-3, 78 brake h.p., 21,835 lbs.; BD-2, 50.5 brake h.p., 17,772 lbs.

SOME OF THE JOBS YOU CAN DO WITH JUST THESE TWO MACHINES

- Clean and shape-up ditches
- Cut and smooth backslopes
- Handle regular maintenance
- Widen and reshape roads
- Make driveways and bridge approaches
- Build berms
- Scarify roads and streets
- Backfill pipe, culverts, bridges
- Take out cuts
- Remove and load sod
- Load surplus dirt from shoulders and ditches
- Remove and load topsoil
- Make fills
- Handle bulldozing
- Make channel changes
- Plow, move and load snow from roads and streets, alleys, parking lots, cemeteries, institutions
- Skid trees
- Load rocks and stumps
- Dig and load dirt
- Load sand, gravel and other material
- Mix black-top
- Do crane work
- Handle all types of hauling or pulling
- Straighten out curves
- Open and rebuild alleys and streets
- Build parking lots
- Cut away embankments obstructing sight

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

B. Perini & Sons began operations on Squirrel Hill Tunnel here at the eastern portal. The Quonset huts at the right house offices, engineering and supply departments, compressor room, and locker rooms. In the foreground is one of the drill jumbos.

Parkway Tunnel Dug Through Rock

Tunnel on Penn-Lincoln Parkway Advances 20 Feet A Day Thanks to Orderly Drilling-Blasting Cycle

✦ WORK is now in progress on the Squirrel Hill Tunnel project of the Penn-Lincoln Parkway, Pittsburgh, Pa. The parkway itself is designed to ease the present congestion of traffic approaching and leaving the Golden Triangle. (See C. & E. M., October, 1948, pg. 53.) And the tunnel, the largest single project ever put under contract by the Pennsylvania Department of Highways, is one of the parkway's most important links, since it will carry traffic under the residential Squirrel Hill district.

The tunnel itself is being driven by B. Perini & Sons, Inc., of Framingham, Mass., at a contract price of $13,767,-843.10, and will be of twin-tube concrete-lined construction. Each tube will be 29 feet 8 inches wide, 60 feet center to center, and will carry a two-lane roadway and a service walkway. Lining will be reinforced concrete 1½ feet

(*Continued on next page*)

Here's the east portal from ground level, with the south-tunnel jumbo (right) being readied for the first drill round. The north tunnel had been driven 200 feet when this view was taken.

The south-tunnel jumbo mounts sixteen 3¼-inch Joy drifters. The center sections of its two bottom platforms can be dropped to let equipment pass.

Inside the south tunnel, the jumbo crew members drill a round at the tunnel face. They also set steel support ribs from the jumbo's top deck.

After the blast, a Lorain 1¼-yard shovel loads tunnel muck to a 15-ton diesel-powered Euclid. The shovel has a special short 14-foot boom and is a diesel model converted to electric.

Joy Axivane Series 1000 fans ventilate the tunnel. This one at the third breakthrough carries air from the fans at the north portal to the working face at right.

Air for drilling at pressures up to 125 psi in Squirrel Hill Tunnel is supplied by four Joy WN-102 compressors located in a Quonset hut. A Joy air receiver is just outside the door at the right.

thick on the sides and 1 foot 9 inches thick on the top. Total length from portal to portal will be 4,225 feet, of which 3,885 feet will be driven through rock by drilling and blasting. The remainder of the length will be cut-and-cover sections at each end. Portal buildings will house ventilation machinery as well as maintenance facilities.

The project was started September 7, 1948, and is scheduled for completion on September 7, 1950. It involves approximately 400,000 cubic yards of excavation, with fills up to 100 feet and cuts of 40 feet. Actual rock excavation will amount to 249,278 cubic yards. Approximately 102,400 cubic yards of concrete, 21,350 squares of brick pavement, 6,000,000 pounds of steel reinforcing bars, and 2,378,000 pounds of structural steel will be used in the tunnels. The two-lane roadways will be constructed of 1-inch subgrade material, 10-inch concrete base, ¾-inch mastic cushion, and vitrified-brick driving surface. The roadway will be on a tangent with a 2.5 per cent grade throughout, rising to the west.

The rock formation through which the tunnel is being driven is mainly sandstone, limestone, shaley limestone, and shale. This formation causes a bad roof condition which makes it necessary to set steel ribs on 4-foot centers for support on both the sides and top of the tunnel. In places the roof is so unstable that only a 4-foot round can be pulled, instead of the standard 8-foot round, to prevent excessive caving. Steel lagging is placed between the ribs, almost solid in places.

Drilling and Blasting

Work started with excavation of the cut-and-cover section at the eastern portal. Drilling and blasting have been used from there on. Development of a definite cycle of operations has resulted in an average daily advance of 20 feet in each tunnel. The average length of the cycle is 8½ hours, which is taken up approximately as follows: drilling, 90 minutes; loading holes, 40; moving jumbo back, 15; shooting, 10; ventilating, 40; bulldozing fly rock, 20; mucking out, 200; moving jumbo to face, 15; and setting ribs, 90 minutes.

Blast holes are drilled from a three-deck steel-frame jumbo which is mounted on rails and towed to and from the face by a bulldozer. The jumbos, one for each tunnel, were fabricated on the job. They are made of structural steel with wood deck planking, and are approximately 38 feet long, 19 feet high, and wide enough to leave just 18-inch tunnel clearance on each side. Both jumbos have solid top decks and two

(Continued on next page)

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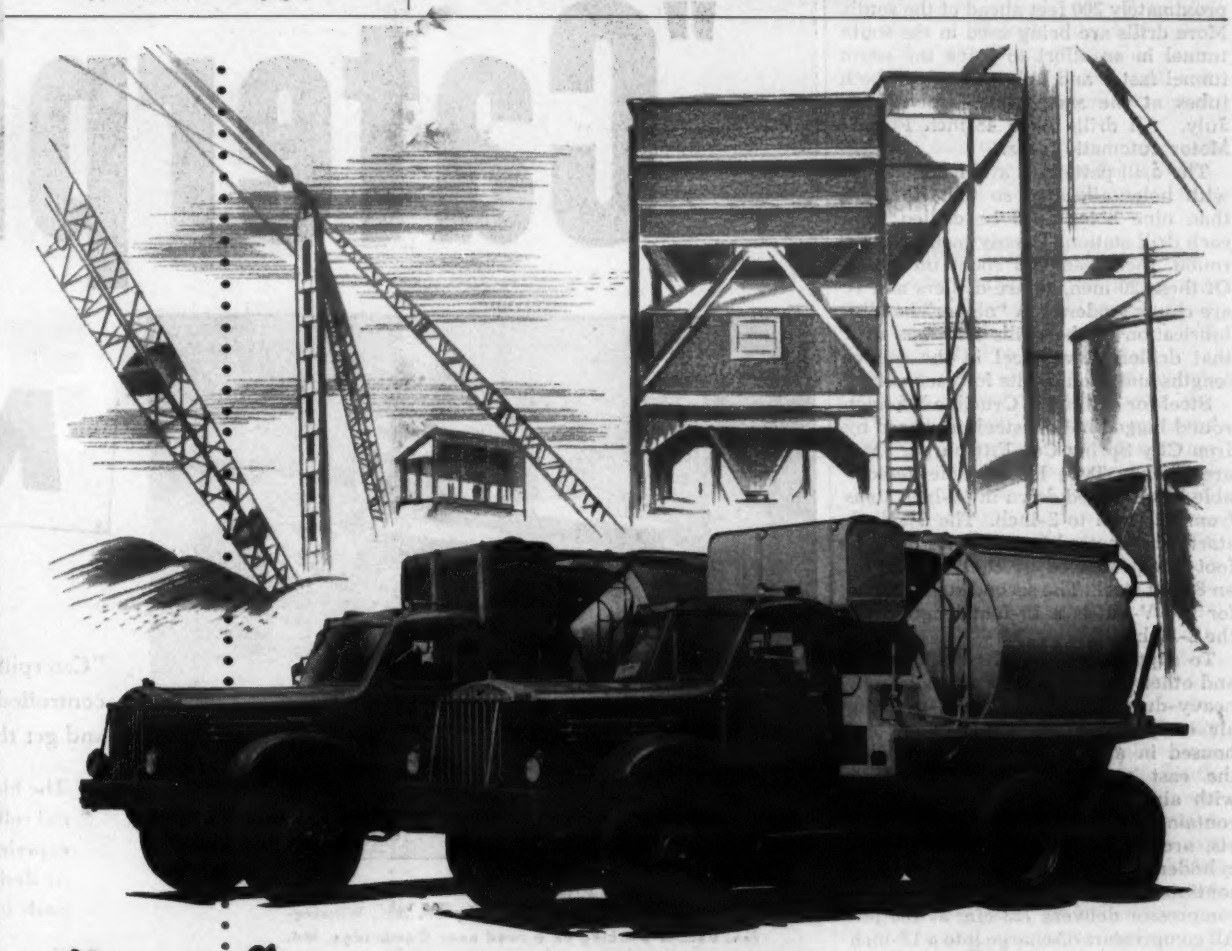


More Concrete—Maximum Economy
with Sterling heavy duty motor trucks

Many satisfied contractors throughout the United States have made Sterling heavy duty motor trucks their choice for efficient heavy duty service.

Engineered for the job, and built with maximum efficiency they render dependable service with the minimum of operating costs.

For your next tough job, choose Sterling and you will choose the finest in performance and dependability.

Write Sterling Motors Corporation, Milwaukee, Wisconsin or contact your nearest Sterling representative for additional information on the wide variety of Sterling models that are available.

STERLING MOTORS CORPORATION
Milwaukee 1, Wisconsin

● Enclosed Drive ● Chain Drive ● Gasoline ● Diesel
● Four Wheel ● Six Wheel ● Multi Wheel Drive (4x4 and 6x6)

BRANCHES AND DEALERS IN PRINCIPAL CITIES

Penn Parkway Tunnel Is Built Through Rock

(*Continued from preceding page*)

platforms. The platforms are stationary outside the vertical columns, with center sections hinged so that they can be dropped to a vertical position to permit the shovel and trucks to pass through. These three decks and the lifter stations give four tiers of drills.

Sixteen 3½-inch Joy drifters are mounted on the jumbo for the south tunnel, while the north-tunnel jumbo mounts ten. The south jumbo has four drills column-mounted on each of the three lower drill tiers. On the top deck the two outside drifters are column-mounted while the two in the center are mounted on Joy Hydro Drill jibs. These hydraulically operated jibs allow quick, easy positioning of the drills; they are designed to simplify collaring the high hard-to-reach center holes. Ten Joy drifters are used in the north tunnel, which was started first and is still approximately 200 feet ahead of the south. More drills are being used in the south tunnel in an effort to drive the south tunnel faster and hole through in both tubes at the same time—around this July. All drills have 48-inch Piston-Motor automatic feeds.

The drill pattern is a 114-hole V-cut with holes allocated so that no more than nine holes need be drilled from each drill station. Twenty men drill the round, then load and shoot the holes. Of these 20 men, 10 are drillers and 10 are chuck tenders. A "nipper" handles lubrication of the drills and sees to it that drillers have steel in the proper lengths and enough bits for each round.

Steel for drilling is Crucible 1¼-inch round lugged hollow steel processed by Iron City Spring Co., Pittsburgh. Bits are Timken Type H side-hole detachable bits, stepped down in ⅛-inch steps from 2¼-inch to 2-inch. The 2¼-inch starter bit is used for all holes on a 4-foot steel, followed by the 2⅛-inch on an 8-foot steel. The second steel change for the V-cut is a 10-foot length with the 2-inch bit.

To supply air for drill requirements and other supplementary air tools, four heavy-duty Joy WN-102 semi-portable air compressors are used. They are housed in a Quonset hut just outside the east portal. These compressors, with air-cooled intercoolers and self-contained water-cooled cylinder jackets, are two-stage double-acting two-cylinder V-belt-driven units of the continuous heavy-duty type. Each compressor delivers 723 cfm at 100 psi. All compressors discharge into a 12-inch header which feeds into a 4 x 14-foot vertical air receiver.

From the receiver, air is carried to the portals in 8-inch pipe. In the south tunnel this 8-inch line is carried to within 50 feet of the face, while a 6-inch line is used in the north tunnel where air requirements are not so great. All air line is Naylor Lockseam Spiralweld pipe, added in 20-foot lengths. Take-off from these pipes to the jumbo is 50 feet of 4-inch Goodall air hose.

The face is blasted by the electric-cap method, using delays of one-second intervals in numbers 0 to 13 inclusive. Hercules detonators are used, and Hercules gelatin extra 40 per cent strength 1¼-inch x 8-inch powder.

Ventilating

Ventilation is provided by five Joy Axivane Series 1000 axial-flow fans of 54-inch diameter, each powered by a 75-hp motor. Three of these fans are mounted one on top of the other at the portal of the north tunnel. They are used either for blowing or for exhausting, depending on which face has been blasted. When blowing, air is forced into the north tunnel at a rate of 240,000 cfm. It is picked up by two more fans, one at the last breakthrough in each tunnel, and carried to the working face by collapsible tubing, then forced out of the south tunnel as free air. When the portal fans are exhausting, free air enters the south tunnel, is picked up by two scavenger fans and carried to the face, and then forced out the north tunnel by the portal fans.

The breakthroughs are driven every 500 feet and will serve as passageways in the completed tunnel. To provide the best possible ventilation for the men working at the face, the scavenger fans are mounted on skids so they can be easily moved up to each new breakthrough as soon as it is driven. Doors in the portal of the north tunnel, large enough to permit trucks to pass through, are kept closed while the fans are running to make the ventilation system as efficient as possible and clear out rapidly the smoke and dust from blasting and the diesel fumes.

Mucking

Mucking is done by a shovel in each tunnel. A Northwest 1¾-yard Model 6 diesel converted to electric drive, and a Lorain Model 82 1½-yard diesel converted to electric drive, are used. Both shovels have specially made 14-foot booms, and one has a 14-foot stick and the other a 16-foot stick for working in the restricted area. The shovels load directly into diesel-powered Euclids of about 13-cubic-yard capacity. The time required for mucking out approximately 600 tons—the quantity of rock pulled with each 8-foot round—is from 2½ to 3½ hours.

The time required to turn the trucks inside the tunnel has been shortened considerably by the use of an oiled steel plate and a Joy hauler. Drivers run the front wheels of their trucks onto the plate at as sharp an angle as possible. Then a steel cable from the hauler is hooked to the front bumper and the front end of the truck is pulled around to where it is an easy matter to back into position at the shovel.

Support Ribs, Lighting

Steel supporting ribs, which are supplied by Commercial Shearing & Stamping Co., Columbus, Ohio, are set by the drilling crews. They work from the jumbo which is towed back to the face immediately after the mucking has been completed. Side beams are hoisted into

(*Concluded on next page*)

"Caterpillar"

MOVE

This D8 Tractor with hydraulic-controlled No. 8S Bulldozer, owned by George S. Lynch, Inc., Wilmington, Del., is working on a road near Cambridge, Md.

A "Caterpillar" Diesel D8 Tractor with cable-controlled No. 8S Bulldozer at work on a highway at Davis Dam, Arizona. Owned by Utah Construction Co., Kingman, Arizona.

THERE are five good reasons why "Caterpillar" Bulldozers — cable or hydraulic controlled — regularly out-produce other units and get the call from owners everywhere.

1 The blade is scientifically curved to keep material rolling smoothly ahead. "Caterpillar's" long experience with motor grader blades helped in its design. It's a lot easier to *roll* dirt than to push it.

2 Controls (cable or hydraulic) give the operator instant, accurate control of the cut. No time is wasted in spinning tracks or excessive lugging down. Only "Caterpillar" cable control has multiple-disc, metallic-lined clutches for easy engagement and disengagement. There's no clutch drag.

3 Angling, tilt and tip adjustments are easy to make — a quick, one-man job for the operator.

4 There's long life in every blade. "Caterpillar" pays up to 30% premium for the high tensile steels that go into these 'dozers.

5 No overhead frame to interfere with visibility. The operator has a full view of the job.

Your "Caterpillar" dealer is as near as your telephone. He can advise you on your bulldozer needs, and he can get 'dozers for quick delivery. It will pay you to get your order in today.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

place by an Ingersoll-Rand utility hoist mounted on the top deck. Roof beams, in two pieces joined at the center, are lifted by the men and bolted into place. After the beams are bolted, areas between the ribs and the rock are blocked up with timber to prevent further caving. In places, this blocking is built up to heights of 5 feet because of the condition of the roof. Lagging is placed where necessary then, and another jumbo follows up to put the lagging in completely solid.

For lighting along the completed sections of the tunnel, the contractor uses Mines Equipment Co. String-A-Lite supplied by Joy Mfg. Co. Added in 100-foot sections, it furnishes lights at intervals along the tunnel and an outlet at the jumbo for floodlights.

Personnel

For B. Perini & Sons, Inc., Louis Capone is Project Manager, Charles H. Taylor is Tunnel Superintendent, Donald Phinney is Project Engineer, Cesare Cevroni is Outside Superintendent, Anthony Casali is Master Mechanic, and Joseph McKiernan is Office Manager on the project.

The Pennsylvania Department of Highways is represented by E. A. Rush and H. E. White, Assistant Construction Engineers; G. M. Heinitch, Structure Engineer; G. E. Riley, Resident Engineer; D. A. Malone, Project Engineer; and H. S. Gahagan, Construction Engineer.

Careful regular maintenance keeps your machines working profitably.

Post-Hole Diggers

A post-hole digger designed to fit any tractor equipped with a power take-off is manufactured by the Ottawa Mfg. Co., 624 King St., Ottawa, Kans. It is made in two styles: the Model TB which mounts on the tractor frame, and the Model TA which is mounted on metal wheels and pulled from the tractor drawbar.

The Model TB is supplied complete with a 9 x 36-inch auger. It is equipped with one full flight on the auger and one quarter flight to give it two detachable cutting lips. A shear-pin safety device is regular equipment. The Model TA is supplied complete with a 10 x 36-inch auger. It is one-man-operated and is controlled from the driver's seat. It has a high-speed heavy-gage 2-flight auger said to throw dirt clear of the hole as it digs. A safety clutch is part of the regular equipment, and the cutting lips are detachable for replacement or for sharpening.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 65.

Tandem Dump Trailer

A tandem-axle hydraulic dump trailer is manufactured by the McCabe Powers Auto Body Co., 5900 N. Broadway, St. Louis 15, Mo. The Model P-20 has a 25-cubic-yard capacity and a 45-degree dumping angle. Lifting is accomplished by a Model D-88 Gar Wood twin hoist. The trailer features all-welded construction throughout, and a lightweight Hi-Tensile steel body.

The semi-trailer is equipped with 12-ply 10:00 x 20 highway-type tires; 16½ x 6 x ¾-inch cam-operated brakes; twin-power brake boosters and slack adjusters; steel wheels with 9 to 10-inch rims; a 33-inch interchangeable lower fifth wheel; short, flexible tractor-trailer hose connections; and cab controls for trailer brakes and hoist operation.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 89.

Two New Hyster Bulletins

Two new bulletins describing and illustrating Hyster equipment have been announced by Hyster Co., 2902 Clackamas St., Portland 8, Oreg.

One of these is a 4-page leaflet, "Hystaway News", which shows the Hyster Hystaway, a tractor-mounted excavator, in action in earth-moving, construction jobs, and general heavy-duty work projects all over the world. The Hystaway unit mounts in less than two hours on Caterpillar D8, D7, or D6 tractors, and can be dismounted in one hour, the manufacturer reports. Dragline, clamshell, crane, and hoe combinations are currently available, and a shovel front will soon be in production.

"Karry Krane News" is a 4-page bulletin describing in photographs, cartoons, and case histories the Hyster Co.'s 5-ton self-propelled mobile crane. Jobs in the United States, Brazil, South Africa, Sweden, and the Fiji Islands are depicted, showing the gasoline-powered pneumatic-tired machine moving many types of heavy and bulky objects. The crane travels equally well over paved or unpaved surfaces, the bulletin points out, and is well adapted to loading and unloading trucks and railroad cars.

These publications can be obtained from the company, or by using the Request Card at page 16. For "Hystaway News" (Form 1110) circle No. 78; for "Karry Krane News" (Form 1115) circle No. 79.

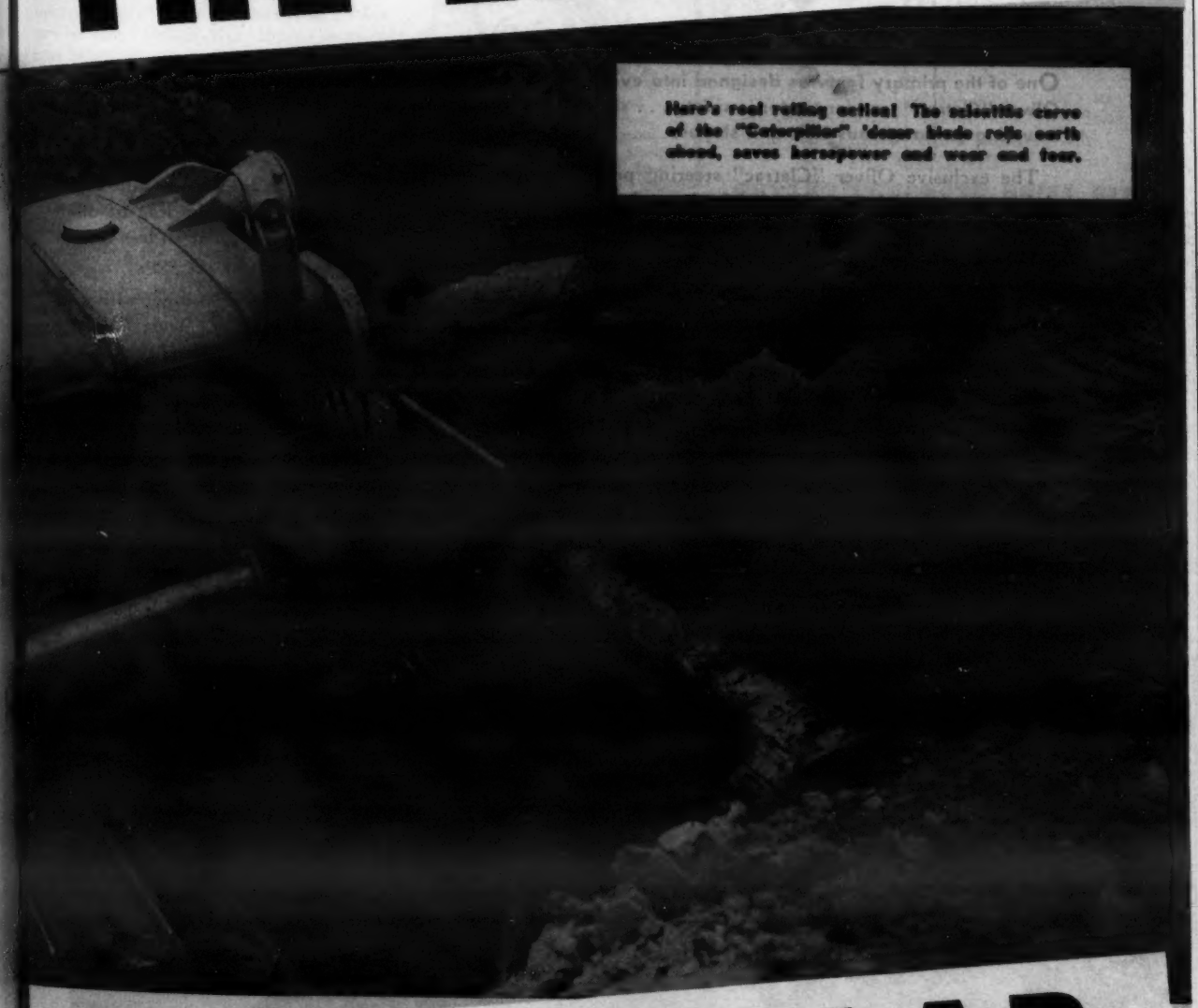
Tank-Filling Pump

A refueling pump for use with drums or tanks is available from the General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32, Pa. It features a Nylon-cord Neoprene-coated diaphragm designed to stand up under gasoline and all motor oils.

The unit is said to pump approximately 7 gpm. It has an automatic drainback feature to permit the hose and pump to be drained back into the tank. The lower casting is threaded for 1½ and 2 inch pipe. The unit's high suction and self-priming action makes it especially advantageous for use with underground tanks, says the manufacturer. It is equipped with approximately 8 feet of hose. A static wire is provided to lessen fire hazard. Each pump is fitted with an adjustable suction pipe and hose.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 60.

'Dozers THE EARTH


Here's real rolling action! The scientific curve of the "Caterpillar" 'dozer blade rolls earth ahead, saves horsepower and wear and tear.

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DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

A blade reach of 10 feet makes the new Gledhill Hi-Lift grader especially adapted for use on high banks.

High-Reach Grader

A new Hi-Lift grader is announced by the Gledhill Road Machinery Co., Galion, Ohio. The primary feature of the new unit is its ability to reach as far or as high as 10 feet. It is particularly recommended by Gledhill for use on high banks.

Other features claimed for the Hi-Lift are its simplified leaning-wheel construction, pneumatic tires, self-locking raising and lowering device, automotive-type steering gear, gears run in oil-tight cases, and Timken tapered roller bearings.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 22.

Stand-By Power Plant

Stand-by power generators are available from the Kato Engineering Co., 4 Elm St., Mankato, Minn. They are powered by 1, 2, or 4-cylinder air-cooled engines and are especially valuable as stand-by units, Kato points out, because there is no radiator and thus no danger of the units' freezing. They are equipped with high-tension magnetos as standard equipment, but they can be supplied with electric cranking if specified.

The Kato stand-by plants are designed to run at 1,800 rpm. Where they are to be used more or less continuously, Kato recommends that they operate at 1,200 rpm. The Katolight generators are built in 1,200, 900, and 720-rpm models in capacities ranging from 5 to 200 kw at 60 cycles, and in other frequencies ranging from 25 to 400 cycles. They can be supplied with or without voltage regulators, and for operation on natural gas.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 26.

New All-Purpose Hose

A new all-purpose hose called Ortac has been developed by the Goodyear Tire & Rubber Co., Mechanical Goods Division, Akron, Ohio. Designed to carry air, water, oil, gasoline, and acids of low concentration and temperature, the hose is made with vertically braided rayon carcass and oil-resisting synthetic tube, friction and cover. It is being manufactured in sizes from 3/16 to 1½-inch inside diameter.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 30.

Arc-Welder Specifications

A new 8-page two-color catalog containing illustrations, descriptions, dimensions, and specifications on the entire Hobart line of arc welders has been released by Hobart Bros. Co., Hobart Square, Troy, Ohio. The line includes electric-motor-driven dc welders in six sizes from 150 to 1,200 amp; gasoline-engine-driven welders in four sizes from 200 to 600 amp; ac transformer-type welders in four sizes from 180 to 500 amp; welding generators in three sizes from 150 to 300 amp; gasoline-engine-driven welders with auxiliary ac or dc power generators; gasoline-engine-driven combination ac arc welders and ac power units in two sizes from 200 to 300 amp; and other models in all sizes for special arc-welding applications.

Features of the machines are individually illustrated and described in Catalog J-2708. Also listed is a high-frequency stabilizer attachment for use with any standard ac transformer-type welder of 500 amp or less. This attachment provides the essential high-frequency stabilization to simplify inert-gas-shielded welding, the catalog points out.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 105.

V. L. Snow Upped by Euclid

V. L. Snow is named Domestic Sales Manager of The Euclid Road Machinery Co. He succeeds the late W. W. Paape. Taking over Mr. Snow's position of Assistant Sales Manager is J. W. Bloomquist.

NEW VAN DORN "QUICK-SAW"* ARM $148.00 (SAW NOT INCLUDED)

Adds RADIAL Features to PORTABLE Electric Saws!

A new Van Dorn Quick-Saw Arm *doubles* the usefulness of your Portable Electric Saws! Helps you do *radial* as well as *portable* sawing with the same tool. Speeds up cross-cutting, bevel cutting, mitre cutting, ripping, plunge-cutting—*with greater accuracy—with less operator fatigue.* All three Van Dorn Electric Quick-Saw models (and most other portable electric saws) fit into the adjustable carriage in a jiffy. Clamps to saw horse or column. Easily adjusted. Ask your nearby Van Dorn Distributor for details. Write for free catalog to: The Van Dorn Electric Tool Co., 787 Joppa Road, Towson 4, Maryland.

*Trade Mark Reg. U. S. Pat. Off.

For Power Specify "Van Dorn" (DIV. OF BLACK & DECKER MFG. CO.) PORTABLE ELECTRIC TOOLS

with OLIVER "Cletrac"!

One of the primary features designed into every Oliver "Cletrac" crawler tractor is safety . . . safe traveling on dangerous hills and slopes.

The exclusive Oliver "Cletrac" steering principle assures positive traction on both tracks *at all times.* For example, when turning, one track is speeded up, the other slowed down. Power is never completely disconnected from either track at any time as is the case with "clutch" type steering. Thus there is always a factor of safety with both tracks engaged, providing power and traction where operations must be carried out regardless of conditions . . . added safety on hills and slopes.

It's easier to handle, too, because there is no need to "declutch" when turning.

This exclusive steering principle lets you take full advantage of all tractor power. Since there is always power on both tracks, you can handle bigger loads . . . can balance the side drag of off-center loads . . . get more work done in less time, features that mean greater profit for you.

Investigate the *plus* advantages you get with an Oliver "Cletrac" crawler tractor. Your Oliver "Cletrac" dealer will be glad to give you the story. The OLIVER Corporation, Industrial Division: 19300 Euclid Avenue, Cleveland 17, Ohio.

Cletrac

a product of

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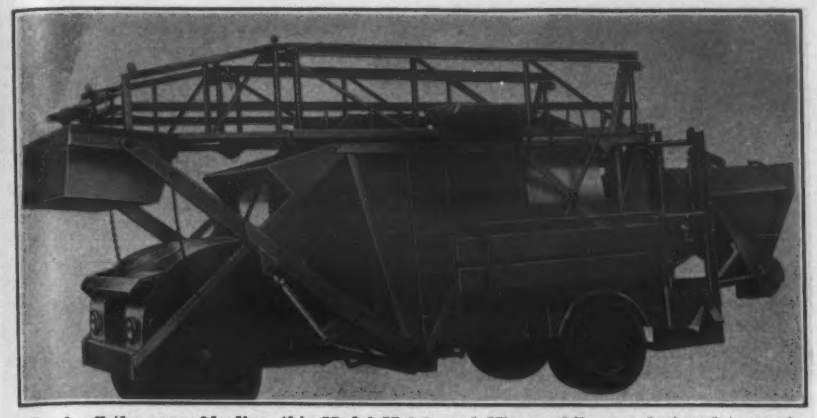
A complete line of Crawler and Industrial Wheel Tractors



Fresh off the assembly line, this Model M-6 1-yard Mixermobile was designed to meet contractors' needs for a model smaller than the 2-yard Mixermobile.

One-Yard Unit Mixes And Hoists Concrete

Introduction of the 1-yard Mixermobile, Model M-6, has been announced by Mixermobile Manufacturers, 6855 N. E. Halsey St., Portland, Oreg. Like its predecessor the 2-yard Mixermobile, the M-6 1-yard model is a complete mobile concrete mixing and elevating plant. It can also be used with ready-mix concrete.

The new model has a hydraulically operated self-loading skip for receiving batched aggregates directly from dump trucks, portable batching plants, or front-end loaders. It has a standard 25-foot steel tower, with 10-foot extensions available. From the mixing drum, the mixture is transferred by a dumping "spoon" into the elevating bucket, then hoisted and poured into the storage hopper. Power is furnished by an 8-cylinder Ford industrial engine. A take-off unit transmits the truck motor power for loading the drum, mixing, and hoisting.

The mixing drum has a single-suspension mounting and is driven by enclosed gears. The mixture can be inspected through front and rear openings in the drum when it is revolving. The water meter can be checked and locked to prevent any variance in quantity of water. As in the 2-yard model, the operator of the 1-yard M-6 stands on the catwalk controlling the various operations by handling four levers.

Folded for traveling, the 1-yard Mixermobile is 24 feet long, 12 feet high and 8 feet wide. It weighs 20,000 pounds, or 6,000 pounds less than the 2-yard model. An experienced operator can set it up or take it down in 10 minutes or less. The unit complies with the standard truck highway speeds.

Further information may be secured from the company. Or use the request card at page 16. Circle No. 127.

Machine for Earth Boring

A catalog describing the features and operation of the Model HD earth-boring machine has been released by the Highway Trailer Co., Edgerton, Wis. The unit, which is designed to dig holes from 9 to 20 inches in diameter and 10 feet deep, is light enough for mounting on 1½-ton trucks.

The catalog features photographs of the HD digging vertical holes, setting poles in place, and drilling holes at an angle to the horizontal. It lists standard equipment, including a 16-inch auger with 5 extra blades and points, a 20-inch auger with 5 extra blades and points, two sets of rack-thrust plates, a set of boring-machine tools, and a 13-foot rack bar to dig 7 foot holes. Also listed is the optional equipment available for use with the Model HD earth-boring machine.

This literature may be obtained from the company, or use the Request Card at page 16. Circle No. 52.

"But *this* drill bit bored more holes in concrete cleaner, faster, and for less money per hole. That's because it's *THE ORIGINAL*

ROTARY CONCRETE DRILL BIT

FREE FACTORY RE-SHARPENING until further notice. *Get the money-saving facts for your concern. Write today for free, illustrated folder giving complete details.*

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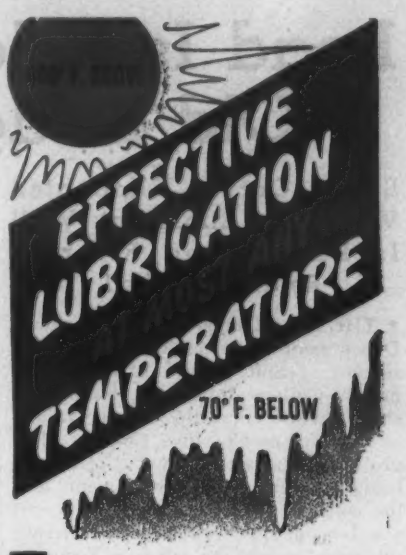

The fact that LUBRIPLATE Lubricants are able to meet extreme temperature conditions, demonstrates the ability of these products to cope with the wide variations often found in everyday industry. Besides this feature LUBRIPLATE Lubricants possess attributes not found in conventional lubricants. Write for literature.

LUBRIPLATE
Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.

LUBRIPLATE
Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.

LUBRIPLATE
Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.

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- NO SHIFTING OF GEARS
fully automatic free-wheeling gear box
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a one lever operation
- POWDER FINE CARPET SPREAD TO A THREE-INCH DEPTH
controlled by Micrometer Depth Adjustment
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oversize particles work through Flexible Keyboard without emptying hopper
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utilize Taper Attachment for this effect
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positive Locking Automatic Hitch

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USE RIGHT BUCKET FOR THE JOB

Hayward makes all three—clamshell, electric motor, orange peel. A Hayward recommendation is unbiased.

THE HAYWARD CO., 32-36 Dey St., New York

Hayward Buckets

Road Is Relocated; Old Bridge Replaced

Sharp Curves Eliminated With New Alignment; Wall Is Built Along River to Retain Roadbed

✦ THE New Hampshire State Highway Department is relocating a mile-long section of State Route 10, the Dartmouth College Road, to eliminate a sharp reverse curve through the village of Marlow in Cheshire County. The project includes the removal of an old bridge on the original alignment, and the construction of a modern concrete and I-beam span—also a new concrete retaining wall. The job is a Federal-Aid secondary project.

The Highway Department awarded a contract for the work to Arthur Whitcomb, Inc., of Keene, N. H., on a low bid of $109,618. The construction of the 70-foot 11¼-inch bridge across the Ashuelot River was handled by Clayton A. "Chippy" Chase of Milford, N. H., while the 240-foot-long retaining wall was built by Ralph Payne of Keene, N. H. The job got under way on September 27, 1948, and satisfactory progress was made during the late fall, on both grading and structures, until the coming of winter brought a halt to operations. Work was resumed in the sping, and will be finished this month.

Improved Alignment

Along the east side of Marlow is the village pond through which flows the Ashuelot River. From the lower end of the pond the river continues southward a few hundred feet to another pond owned by the Andorra Forest Products Mill. This millpond, dammed at the lower end, furnishes water power for the mill wheel. Below the dam the river flows south through a narrow gorge, with State Route 10 paralleling it along the east or left bank. The contract begins at the lower end of the gorge and runs northward for 5,100 feet.

At the beginning of the contract the alignment of the old road is held for the stretch bordering the gorge until the upper end of the millpond is reached. The new retaining wall was built in this section to buttress the widened roadbed. At the upper end of the millpond the old road curved, then cut across the river on a narrow iron-truss bridge. State Route 10 continued through the village streets before making another sharp turn to gain the open highway at the north end of Marlow.

Instead of turning sharply westward at the upper end of the millpond, the road now crosses the river on a modern wide span and skirts the western edge of the village pond on a new alignment with flat curves. It then continues through new location to a point beyond the north end of the village where it rejoins the old road. The original bridge will be removed, but access to the new highway from the village streets will be provided by a connecting approach road north of the new span.

Concrete Retaining Wall

First on the construction agenda came the building of the concrete retaining wall which borders the highway along the edge of the river gorge. Originally the Highway Department planned for a mortar-rubble masonry wall at this location, but the contractor, exercising his option in this regard, chose instead to build the wall of plain concrete. The substitution was made because he feared the river would rise and drive out the hand labor needed to build a rubble wall. With a concrete wall, once the footing was in, high water was not so much of a menace, since the concrete was placed from the bank on the east or high side of the river.

Building a cofferdam against this quick-rising river was something of a problem. Concrete had to be poured in the dry, and the bottom of the wall footing is 5 feet below the normal level of the water in the gorge. Cofferdams of either steel sheet piling or sandbags were considered. Either would be adequate but also expensive; the sheeting because of material and equipment costs, and the sandbags because of the hand labor involved. It was finally decided to build a cofferdam of well compacted earth.

An International TD-18 tractor with a Bucyrus-Erie dozer blade started at one end of the wall location and cut into the bank of the gorge, throwing the material into the river. The dozer worked along the bank on top of the excavated material, thus compacting this bench into a solid earth fill. When

(Continued on next page)

C. & E. M. Photo
In a cut section north of the new Dartmouth College Road bridge, a TD-18 tractor with a Bucyrus-Erie blade dozes out boulders and gravel.

One man lifts or pulls loads up to 10,000 lbs. with the AMERICAN HANDIWINCH. Simple, rugged, weighs only 95 lbs. Carries easily, sets up anywhere. Cut steel gears, two gear ratios. Has demountable tail yoke. Triple-width drum model also available. Sold everywhere; made by AMERICAN HOIST AND DERRICK CO., ST. PAUL 1, MINNESOTA.

ALSO MAKERS OF GENUINE CROSBY CLIPS AND AMERICAN BLOCKS AND SHEAVES.

CHOOSE "QUICK-WAYS" REG. U. S. PAT. OFF. FOR SURE PROFITS

In all power shovel applications, capacity and utility are essentials. A truck shovel must have high speed mobility, be immediately convertible, and have adequate capacity to be economical on every job. A "QUICK-WAY" has all these fundamentals plus a long list of others.

"QUICK-WAYS" are designed for full truck speed, on or off the highway. Mounted on any standard truck, the working parts provide perfect operating balance for the truck shovel. All-steel construction gives built-in strength and lightness for maximum capacity and stability.

You get more utility out of a "QUICK-WAY" fully equipped, than any comparable equipment. Each "QUICK-WAY" is easily converted in minutes from Shovel to Crane, Dragline, Clamshell, Pile Drive, Scoop, Trench Hoe, Backfiller, etc. Buy only the attachments you want; your "QUICK-WAY" does more jobs better.

Parts are rugged and simple, requiring a minimum of servicing and having proved ability to take a life long beating. Many interchangeable parts and easy accessibility simplify maintenance and repair. From engine to attachment, every "QUICK-WAY" part will deliver its capacity rating and more.

The essentials built into every "QUICK-WAY" mean sure profits on a small investment; economical to buy, economical to use, it's one of the most useful machines you can own. There's a "QUICK-WAY" owner near you; ask HIM.

MODEL E: 4/10 cu. yd. capacity, mounts on any standard 5-ton truck.
MODEL J: 1/4 cu. yd. capacity, mounts on any standard 1½-ton truck.

"QUICK-WAY" TRUCK SHOVEL COMPANY
DENVER, COLORADO
Worldwide Distributor Sales and Service
PIONEER IN POWER SHOVELS FOR TRUCK MOUNTING AND STILL THE LEADER

a wide well compacted shelf was thus established at the edge of the water, the dozer withdrew. A Bucyrus-Erie 22-B ¾-yard drag shovel then dug out a trench along the inside of this dirt ledge, piling the material up in front along the river side. The machine worked from the compacted bench made by bulldozer during this operation, and the entire cofferdam for the 240-foot wall was built in just one day, with the services of only two operators for the dozer and drag shovel. Within the cofferdam the leakage was negligible; a single Jaeger 2½-inch pump served to keep the trench dry.

Truck-Mixers Used

The footing for the wall is 6 feet 6 inches wide x 3 feet deep, and supports a stem that varies in height from 11 feet at the center, the high point, to 3 and 6 feet at the ends. At the top the wall is 2 feet wide, and at the bottom it is 5 feet 6 inches wide, stepping in 6 inches on each side from the edge of the footing. On the river side the batter of the wall is ½ on 12, while the land-side face is flatter, having a batter of 4 on 12. The footing was poured first throughout the 240-foot length of wall, during a low-water stage in the river, and was followed by the stem pours. Concreting was done in six 40-foot monolith sections.

Forms were built in 8 x 12-foot panels of 1-inch lumber, and backed with 2 x 6 studs on 16-inch centers, with double 2 x 6 wales on 30-inch centers. Richmond Tyscrus on 30-inch centers held the panels together. Two sets of windows were cut in the land side of the forms to admit concrete—one in the bottom and the other in the top on 8-foot centers along the panels.

The concrete was supplied from the ready-mix plant of Arthur Whitcomb, Inc., the prime contractor, at Keene, N. H., 20 miles to the south. Four truck-mixers were used on the wall pour which totaled 450 cubic yards of concrete. The mixers were two 3-yard Ransomes, one mounted on a Mack and the other on an International truck; and two Jaeger mixers, a 3-yard unit on an International and a 4½-yard mixer on a Mack truck. As the concrete was chuted into the forms it was vibrated by a Jackson vibrator. Curing was done with burlap and water.

When the wall pours were completed, the backfill along the land side was made with the gravel material that was used in building the earth cofferdam. The top of the new pavement is 4 inches below the top of the wall, and guardrail is strung along the edge of the pavement for this stretch of road bordering the river.

New Bridge

The new bridge has a 70-foot 11¼-inch span and is designed for H20-44 loading. It consists of two concrete abutments supporting a steel I-beam and concrete deck-slab superstructure. It has a clear roadway of 26 feet, with a 3-foot sidewalk on each side. Because of its location at the very edge of the village pond, steel sheeting was required in the construction of the abutments. The abutments are also supported on steel bearing piles. In order to expedite the project, and to avoid the usual delays in getting steel, the Highway Department purchased the structural members well in advance of the letting of the contract, from the American Bridge Co. at Ambridge, Pa.

Under each abutment are eleven steel 12-inch 53-pound H-piles, with a design load of 35 tons per pile. Five piles, 29 feet 6 inches long, are vertical, while six piles, 31 feet long, are battered. The abutments are protected in front with a stone fill and riprap. They were poured during the late autumn of 1948, together with a 6 x 7-foot box culvert 58½ feet long.

The superstructure, erected this spring, consists of five stringers—36-inch WF beams at 260 pounds—on 7-foot centers, and 27-inch WF 94-pound beams for diaphragms on 16-foot centers. The steel supports a reinforced-concrete deck slab from 7¾ to 8⅛ inches thick, which is topped with ½ inch of monolithic concrete wearing course. A pipe guardrail goes along the sides of the bridge.

Grading

The roadbed of the mile-long relocation is 34 feet wide. It consists of a 24-foot bituminous surface-treated pavement flanked by 5-foot shoulders with a 24 to 1 slope. In fill sections up to 7 feet high, the side slopes are 4 to 1; over 7 feet the slopes are 1½ to 1. Good drainage is assured with a gravel base course from 12 to 20 inches thick. On top of that is a 4-inch gravel surface course which extends out through the shoulders, with a 3-inch center crown for the pavement. The surface treatment will comprise two applications of RT-3 tar, 0.5 gallon and 0.25 gallon to the square yard; each shot will be covered with a coating of sand.

Grading was handled by two Wooldridge 12-yard scrapers pulled by International TD-18 tractors. A TD-18 tractor with a Bucyrus-Erie blade also worked in the cut sections where the material was moved only short distances. Gravel borrow is one of the large items in the contract, since it was required for the fills, the base course, surface course, and backfill around the bridge and structures. The contractor acquired two borrow pits of good-quality gravel, one about midway on the job, and the other just off the south end. The gravel was moved either by the two scrapers, or by four International 8-yard trucks which were loaded at the pit by a Bucyrus-Erie 22-B ¾-yard shovel. A TD-14 dozer leveled the material as it was dumped.

In the roadway sections bordering the village pond, the borrow was dumped as close as possible to the edge of the water by both the scrapers and trucks, then the dozers pushed the material gradually out to build up the fills. The final shaping of the roadbed was done by a motor grader.

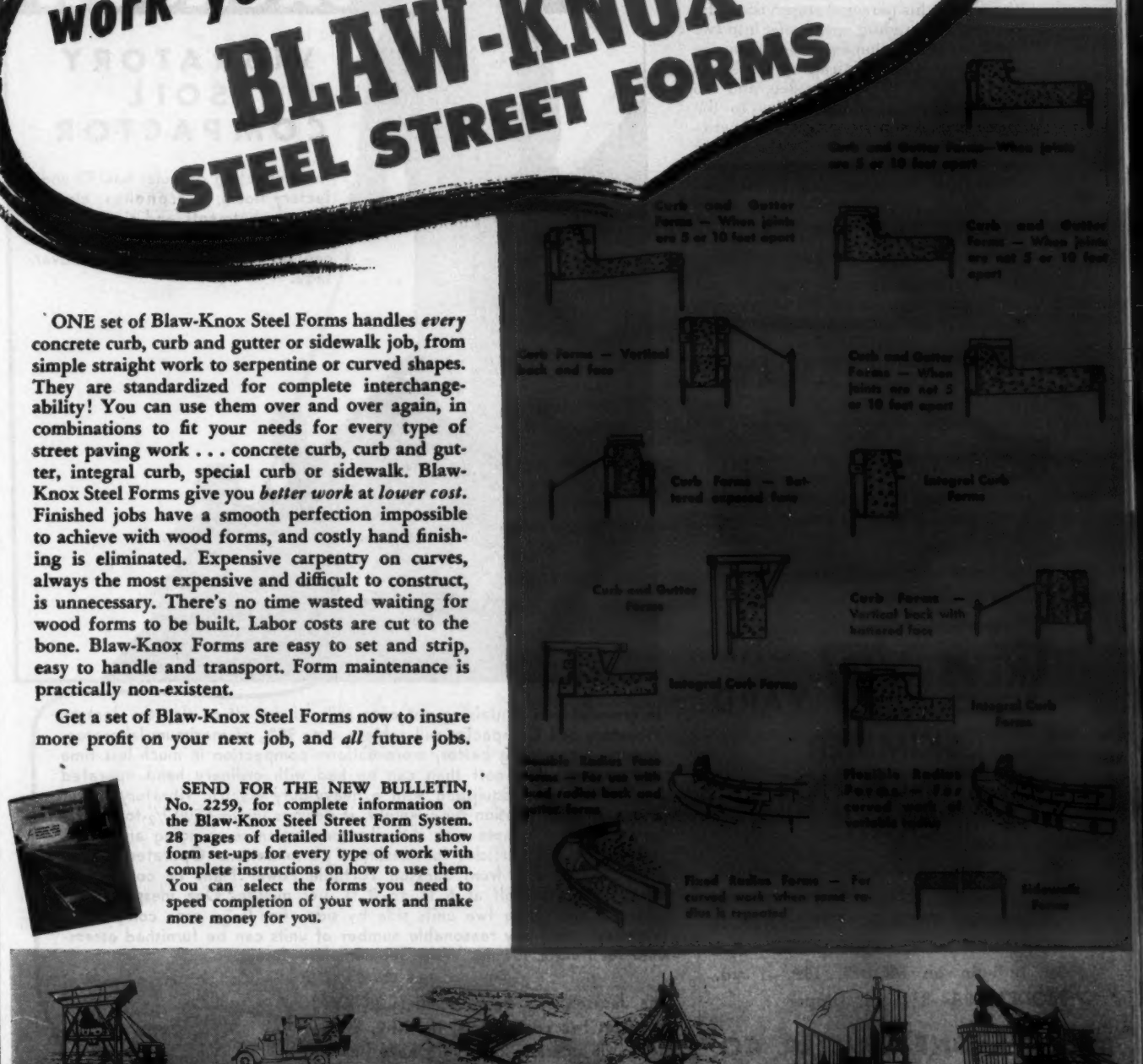
Quantities and Personnel

The major items in this highway-

(*Concluded on next page*)

Look at the variety of work you can do with a set of

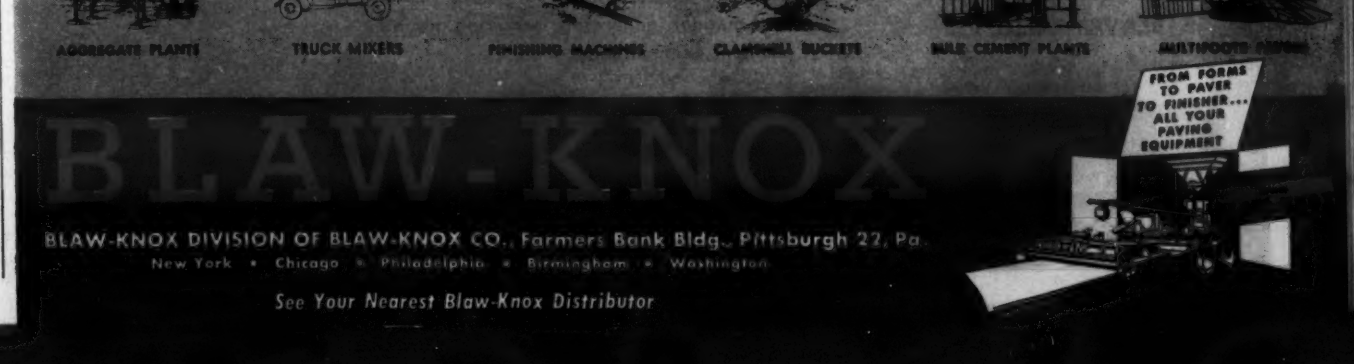
BLAW-KNOX STEEL STREET FORMS


Curb and Gutter Forms — When joints are 5 or 10 feet apart
Curb Forms — Vertical back and face
Curb and Gutter Forms — When joints are not 5 or 10 feet apart
Curb Forms — Battered exposed face
Integral Curb Forms
Curb and Gutter Forms
Curb Forms — Vertical back with battered face
Integral Curb Forms
Integral Curb Forms
Flexible Radius Forms — For use with back and gutter forms
Flexible Radius Forms — For curved work of variable radius
Fixed Radius Forms — For curved work when same radius is repeated
Sidewalk Forms

ONE set of Blaw-Knox Steel Forms handles *every* concrete curb, curb and gutter or sidewalk job, from simple straight work to serpentine or curved shapes. They are standardized for complete interchangeability! You can use them over and over again, in combinations to fit your needs for every type of street paving work . . . concrete curb, curb and gutter, integral curb, special curb or sidewalk. Blaw-Knox Steel Forms give you *better work* at *lower cost.* Finished jobs have a smooth perfection impossible to achieve with wood forms, and costly hand finishing is eliminated. Expensive carpentry on curves, always the most expensive and difficult to construct, is unnecessary. There's no time wasted waiting for wood forms to be built. Labor costs are cut to the bone. Blaw-Knox Forms are easy to set and strip, easy to handle and transport. Form maintenance is practically non-existent.

Get a set of Blaw-Knox Steel Forms now to insure more profit on your next job, and *all* future jobs.

SEND FOR THE NEW BULLETIN, No. 2259, for complete information on the Blaw-Knox Steel Street Form System. 28 pages of detailed illustrations show form set-ups for every type of work with complete instructions on how to use them. You can select the forms you need to speed completion of your work and make more money for you.



BLAW-KNOX

BLAW-KNOX DIVISION OF BLAW-KNOX CO., Farmers Bank Bldg., Pittsburgh 22, Pa.

New York • Chicago • Philadelphia • Birmingham • Washington

See Your Nearest Blaw-Knox Distributor

C. & E. M. Photo

To buttress the widened roadbed of New Hampshire State Route 10 along the Ashuelot River, Contractor Ralph Payne built a concrete retaining wall. Here a Ransome 3-yard truck-mixer mounted on a Mack discharges its contents to wall forms.

Road Is Relocated; Old Bridge Replaced

(Continued from preceding page)

relocation project included the following:

Earth excavation	16,500 cu. yds.
Earth borrow	26,000 cu. yds.
Gravel borrow	18,450 cu. yds.
Bitumen for surface treatment	13,000 gals.
Concrete for structures	209 cu. yds.
Reinforcing steel	30,717 lbs.
Concrete for wall	450 cu. yds.
Structural steel (State-supplied)	125,000 lbs.
Steel bearing piles (State-supplied)	35,350 lbs.

Contractor Arthur Whitcomb gave the project his personal supervision. He divided the grading operations into two sections, one section extending from the beginning of the contract at the south end as far as the new bridge, and the other section from the bridge to the north end of the job. Grading operations on these two sections were carried on under the direction of Superintendents Leon Churchill and Tubio Giovannangeli respectively. An average force of 20 men was employed.

For the New Hampshire State Highway Department, W. S. Morrill was Resident Engineer on the roadway and on all structures except the bridge; the building of the latter was supervised by Resident Engineer Nicholas J. Cricenti. The Department is headed by Frederic E. Everett, Commissioner, with D. H. Dickinson the Chief Engineer. H. E. Langley is Bridge Engineer and R. H. Whitaker is Construction Engineer.

Need information on equipment? Use Request Card at page 16.

Diesel Tractor in Action

The features and operation of the DW10 high-speed heavy-duty rubber-tired diesel tractor are described in an 8-page catalog prepared by the Caterpillar Tractor Co., Peoria 8, Ill. Catalog No. 11962 stresses the usefulness of the DW10 in a wide variety of applications and with several types of auxiliary equipment.

The catalog shows the DW10 in use with scrapers, dump wagons, water-tank trailers, etc. Pictures show these various combinations in action on leveling, scraping, digging, hauling, and loading operations on all types of construction and earth-moving work. Each illustration in the catalog has with it a short descriptive paragraph explaining the operations being performed, and pointing out how the power and speed of the DW10 is adapted to this type of work.

This literature may be obtained from the company, or by jotting down No. 131 on the Request Card at page 16.

TRADE MARK KEYSTONE REGISTERED U. S. PATENT OFFICE

ONE YARD

SKIMMER
TRENCH HOE
CRANE

This modern shovel with power-building planetary clutches, is uniquely efficient in TRENCH EXCAVATION, ROAD AND STREET PAVING. Ask for bulletin on MODEL 18A—1 yd., MODEL 19A—1¼ yd. Dipper.

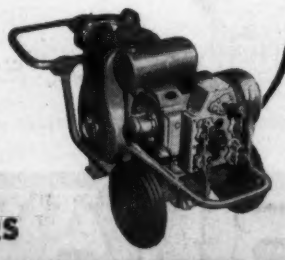
KEYSTONE DRILLER CO.
BEAVER FALLS, PA.

The JACKSON
VIBRATORY SOIL COMPACTOR

In compacting granular backfill under factory floors, in trenches, close to bridge abutments and similar places inaccessible to rollers, this machine can be used to tremendous advantage.

In granular soils containing not over 15% of dry silt or clay the Jackson Vibratory Soil Compactor will achieve over 95% of maximum laboratory density — providing better, more uniform compaction in much less time and at much less cost than can be had with ordinary hand operated backfill tampers. Equipped with a heavy-duty electric vibratory motor and a 150 lb. reaction type weight, it delivers up to 4500 ½-ton vibratory blows per minute with the vibratory action rearranging and interlocking the soil particles for maximum consolidation. Operates on 110 volt, 3-phase AC from Jackson Portable Power Plant or commercial power. Propels itself at 6 ft. to 8 ft. per minute. One inexperienced operator can guide two units side by side. For large area compaction (highways, etc.) any reasonable number of units can be furnished assembled for tractor towing. Write for complete details.

The Jackson M-1 Power Plant (1.25 KVA) operates two compactors; the M-2, at the right, will operate five. Both have permanent-magnet generators requiring no adjustment or maintenance.



FOR SALE OR RENT BY
JACKSON DISTRIBUTORS

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON, MICH.

FOR FASTER-FASTER Drilling

THE McCARTHY VERTICAL DRILL

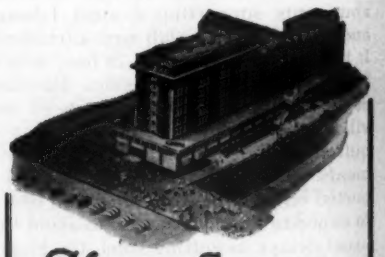
● For record-breaking performance... for ease of operation, you can't top a McCarthy Vertical Drill. Recently, on one difficult job, workers using McCarthy equipment drilled an 8-inch hole 100 feet deep in only 40 minutes! The derrick is raised and lowered by hydraulic power . . . finger tip controlled . . . and a 60 H. P. gasoline motor is part of the standard equipment.

The McCarthy Vertical Drill, manufactured by The Salem Tool Co., is adaptable to high wall and key way drilling and diamond drill boring . . . drills 90% of all limestone and sand rock formations, and readily burrows through shale. Send today for complete information, and for a free copy of The Salem Tool Company booklet.

MINING EQUIPMENT SINCE 1901

SALEM

THE SALEM TOOL COMPANY
SALEM, OHIO, U. S. A.



HOTEL STRAND

ATLANTIC CITY'S HOTEL of DISTINCTION

Devoted to the wishes of a discriminating clientele and catering to their every want and embracing all the advantages of a delightful boardwalk hotel.

Spacious Colorful Lounges—Sun Tan Decks atop—Open and inclosed Solaria—Salt Water Baths in rooms—Garage on premises. Courteous atmosphere throughout.

When in Atlantic City visit the
FAMOUS FIESTA LOUNGE
RENOWNED FOR FINE FOOD

OPEN ALL YEAR
Under Ownership Management
Exclusive Penna. Ave. and Boardwalk

The Willits rotary expansion-joint remover at work on U. S. 101 south of San Francisco. The unit is operating at approximately 1,500 linear feet per hour.

Rotary Joint Cleaner

A rotary cutter for removing old asphalt expansion joints is manufactured by the San Jose Pipe & Tank Co., 1500 Block, W. San Carlos St., San Jose, Calif. It is for use on streets, highways, and airport runways and aprons.

The Willits rotary cutter is powered by a 4-hp Model AK Wisconsin gasoline engine. Power is transmitted to the cutters by a Gates A51 V-belt drive. According to the manufacturer, the rotation of the cutter tends to pull the machine forward and help the operator. The depth of cut is controlled by a wheel located near the operator's left hand. An exchangeable cutter accommodates various joint widths. The Willits unit has carbide-tipped cutters. It is mounted on 3:50 x 6 pneumatic tires.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 35.

High-Speed Mowers

Power mowers for high-speed operations are manufactured by the Lundell Mfg. Co. of Meriden, Iowa. They feature ease of operation, positive safety release, 3-point support, touch control, and adaptability for use with any wheel tractor. The mower is driven by a power take-off, with either hydraulic or mechanical controls. The automatic safety release protects it against damage when it hits an obstruction, and the cutter bar is reset for mowing by reversing the tractor.

The Lundell unit is mounted on two kick-stands and a caster wheel, making attachment a simple, quick operation. The power and flywheel shafts are carried on heavy-duty friction-reducing Timken bearings to provide smooth, positive delivery of power from the power take-off to the sickle. The flexible hitch bar permits the entire mower to follow the lay of the land and provide even cutting at all times, Lundell points out.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 43.

Catalog on Jaw Crushers

Jaw crushers are the subject of a comprehensive catalog put out by the Pennsylvania Crusher Co., Liberty Trust Bldg., Philadelphia 7, Pa. Bulletin No. 5011 features the advanced-design hinge-pin location of the Kue-Ken crushers which is said to permit crushing without rubbing. It also stresses their product control, pitman and toggle, lubrication, and safety devices.

It provides a detailed description of several construction features of the crushers, including the hinge pin and jaw, frame, jaw plates, adjustments, diaphragm, toggles, pitman, mechanism, safety device, shaft and bearings, and lubrication. A general description covers the control of material size, pendulum action of the jaws, low bearing pressure, jaw plate, high-speed operation, and minimum vibration.

Specifications of 17 crusher models are listed. These include the crusher number, size of feed opening, usual speed, capacity per hour with jaws set at various dimensions, horsepower, and approximate weights. The catalog also contains complete ordering and installation data.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 39.

BUY
U.S. Savings Bonds
★ ★ ★ ★ ★ ★

A MILLER *Tilt-Top* is BUILT TO TAKE THE LOAD

Shown is the Model B 10-ton heavy duty trailer

IMMEDIATE DELIVERY
Chassis, platform, tires..$975.00
Optional Equipment Includes . . . Two Speed Winch
Hydraulic Tilt Control
Electric Brakes

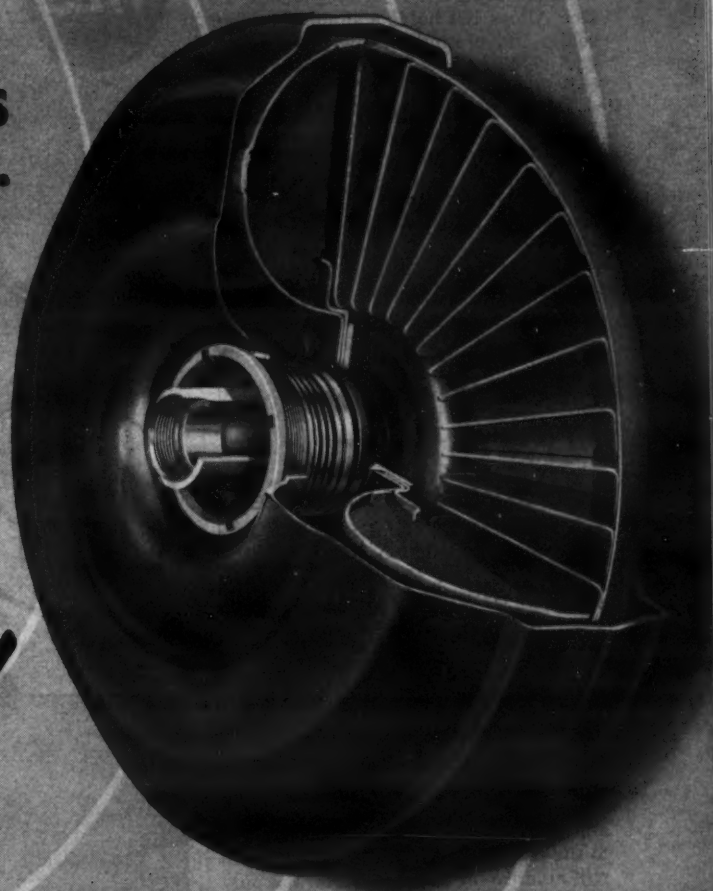
Miller time tested and proven trailers are REALLY built to take the load. The model B is known from coast to coast for dependability and ruggedness. Miller features an oak platform on an all welded frame, 16" deep at center with Budd hubs and wheels. Miller superior construction and fine engineering make it the safest and most dependable trailer on the road.

RAY MILLER RESEARCH ENGINEERS
DEPT. 349 MILWAUKEE 9, WISCONSIN

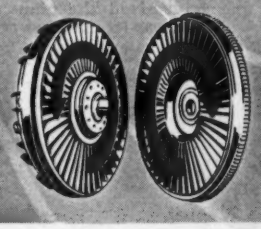
Great News from Chrysler!

CHRYSLER
INDUSTRIAL ENGINES
now available with...

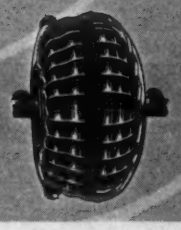
gyrol
Fluid Drive
at Amazingly Little Cost!



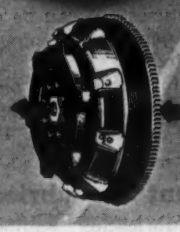
Actually only slightly more than the conventional flywheel which it replaces.



Driver and Runner flywheels are shaped like shallow bowls fitted inside with fins. They operate as separate units, with no mechanical connection—no metal-to-metal contact.



As the Driver turns inside the sealed steel drum, the confined oil produces a powerful swirling out-thrust. Instantly, the Runner receives the impulsion and transmits smooth power to the load.



The coupling is an integral unit. No adjustments are necessary. Oil maintains required fluidity over a wide temperature range. Remains unaffected by seasonal temperature changes.

PROVED on more than a *million* Chrysler, DeSoto and Dodge passenger cars and trucks over a period of 11 years.

PROVED on thousands of industrial jobs—scores of applications under rugged field conditions.

Chrysler's famous Fluid Coupling opens a whole new field for the improved operation of power equipment! A way to reduce excessive clutch wear! A way to protect equipment from damaging shock overloads! A way to get gradual *oil-smooth* acceleration. A way to assure better performance, longer wear and lower upkeep. A way to secure many other advantages peculiar to your equipment. *—at negligible small cost!*

Tell us your needs. See your Chrysler Industrial Engine dealer or write us. Parts and service quickly available everywhere. *Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.*

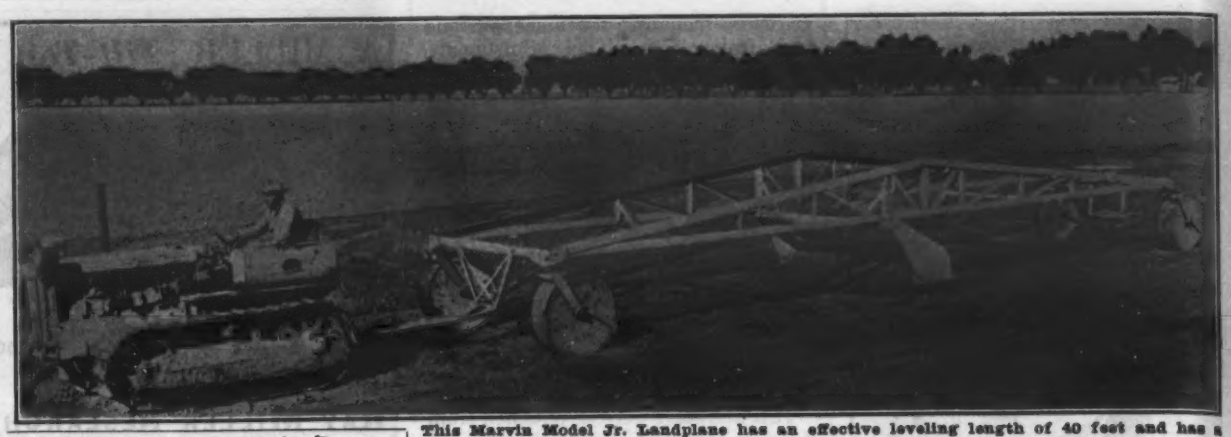
CHRYSLER
Industrial Engines and Power Units
HORSEPOWER WITH A PEDIGREE

Dirt-Mover, Leveler

A land-leveling and dirt-moving machine is manufactured by the Marvin Landplane Co., P. O. Box 217, Woodland, Calif. It is designed for use where a large quantity of dirt is to be moved and the land left level, as for airports, soil conservation projects, grass-seeding operations, etc.

The Marvin Landplane is available in fifteen models varying in bowl widths from 7 to 15 feet and in lengths of from 30 to 80 feet. The 60 and 80-foot models can be adjusted to a length of 30 or 40 feet for use in exceptionally rough terrain. Power requirements for the towing tractors vary from 30 hp for the small-width models to 110 for the larger ones. The Landplane can be equipped with rubber or steel wheels. Rear-wheel stabilizers for positive trailing are standard equipment.

Further information may be secured from the company, or by using the Request Card at page 16. Circle No. 93.



This Marvin Model Jr. Landplane has an effective leveling length of 40 feet and has a bucket capacity of 1¼ to 2 yards. In all, 15 different models of the Landplane are available, in length varying from 30 to 80 feet.

Welding Alloys Kit

A kit of low-temperature alloys and fluxes for gas-welding operations has been prepared by All-State Welding Alloys Co., Inc., 273 Ferris Ave., White Plains, N. Y. Contained in a metal box measuring 2 x 4½ x 20½ inches, the Doc Alloys Kit holds a supply of silver solder and 10 kinds of low-temperature gas-welding rods, a low-temperature galvanizing powder, and 8 fluxes.

The various rods are individually color-marked and are held in labeled pockets in a leatherette roll. Each flux jar is labeled. A booklet of instruction is supplied with each kit, and the cover of the box contains a chart of the contents of the kit with working directions. In addition to its use as a utility kit, it also serves as a sampler for the full All-State line of low-temperature gas-welding rods, the manufacturer points out.

Further information may be secured from the company. Or jot down No. 132 on the Request Card at page 16.

Cold-Water Container

A container for supplying clean, cool water on construction jobs is manufactured by The H. D. Shawver Co., Inc., 1120 S. Santa Fe Ave., Wichita 11, Kans. The Therm-O-Can, as it is called, is also designed to keep foods and liquids hot, if desired.

It comes in several styles, with push-button faucets, with coffee-urn faucets, or with no faucet, and is available in sizes of 1½, 3, and 5 gallons. The cans feature a bale-locking lid, carrying handle, large opening, braced bottom, and spun-glass insulation. According to the manufacturer, the Therm-O-Can will hold ice for 24 hours at normal outside temperatures. It can be equipped with nested pans for keeping various items separated.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 44.

Equipment for Lubrication

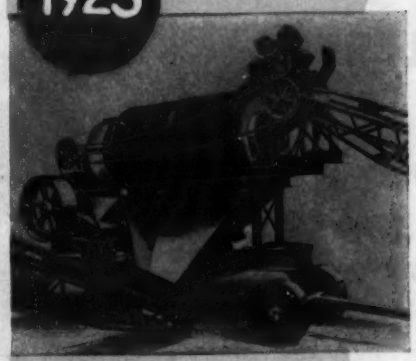
Portable lubrication equipment is described in bulletins prepared for distribution by Balcrank, Inc., 1200 Brookins St., Cincinnati 9, Ohio. It is recommended by the company for lubricating all automotive and construction equipment, and it includes booster pumps for mounting directly on grease containers, Lube-All guns, and special gun and filler sets.

These bulletins, which are punched for insertion in standard catalogs, illustrate the various types of equipment, list the sizes in which they are available, and describe their general features of operation. Illustrations show the Balcrank equipment in use on a wide variety of jobs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 121.

Year after year Cedarapids gives you

1923



BACK in 1923, the Cedarapids One-Piece-Outfit put high capacity aggregate production *on wheels* for the first time. Year after year since then, Cedarapids portable plants have been improved, increasing production from 20 to 250 tons per hour and even more. The use of big roller bearings, manganese steel, rubber tires, V-belts, universal drives, horizontal vibrating screens and hundreds of other improvements have resulted in aggregate producing plants that are world famous for big volume production with the lowest possible operating and maintenance costs, easy portability and highest quality aggregates. Today, there's a full line of Cedarapids Portable Crushing and Screening Plants, in sizes and types to fit every product requirement and every job.

20 tons per hour with this Cedarapids "first", built in 1923...the One-Piece-Outfit consisting of a bucket elevator, a jaw crusher and a revolving screen, all on wheels. With this first really portable unit, the aggregate plant could be moved wherever necessary to crush and screen whatever was closest to the job, without loss of time or profit-eating costs.

1949 CRUSHING and SCREENING PLANTS

1 Cedarapids Master Tandem producing aggregate for paving a new 4-lane free way through Santa Ana Canyon. With capacities up to 250 *tons per hour*, the Master Tandem is the all-purpose gravel plant with the versatility to handle many different contract requirements.

2 This Cedarapids Junior Tandem makes traffic-bound material for a modern stone and sand company, whose postwar renovation program has raised the plant capacity from 500 *tons* to 1500 *tons per day.*

3 Cedarapids Pitmaster on a Canadian job easily produces 35 *cu. yds. per hour*, with 55% crushing. The Pitmaster Straightline is the smallest complete Iowa portable crushing and screening plant.

4 Capacities of 250 *tons per hour, and more*, with Cedarapids Unitized Crushing and Screening Plants, consisting of any combination of the basic primary crushing, scalping, secondary crushing, and wet or dry screening units. Each unit can be used alone or in combination with the others to handle *every* aggregate job.

Buy the Best...

Cedarapids Built by IOWA

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New Conveyor Trailer Moves Cement Blocks

A new type of conveyor trailer for use by building contractors as well as by cement-block producers has been announced by Arthur Rehberger & Son, Inc., 320 Ferry St., Newark, N. J. This Tip-Top trailer is equipped with conveyors so designed that each cement block rests on two of the conveyor's ball-bearing rollers. The load is controlled by three winch lines running from the forward part of the trailer frame, and it is regulated by a 16-inch disk brake. The platform frame is hydraulically controlled, as is the tailskid. Patents are pending on the conveyor and controls.

This Tip-Top conveyor trailer can unload 600 cement blocks in one operation, at a time saving of 1½ to 2 hours per load. No helper is required.

Because of the design, the manufacturer points out, 8 cubes of cement block, with 75 blocks to a cube, may be unloaded in one simple operation, without damage to the blocks. A larger 20-ton model, which will accommodate 10 cubes of blocks on the trailer proper will soon be available.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 99.

Liquid Preservative For Wood or Fabric

A chemical preservative for wood or fabric is produced by the Cuprinol Division of Darworth, Inc., Simsbury, Conn. Cuprinol can be applied before the wood is erected, the company points out, or to members already in place; no special pre-treatment is required. The chemical is used in liquid form and can be applied by brush, spray, or by dipping.

Cuprinol is described as a penetrating metal-base solution of copper or zinc naphthenate designed to preserve wood and fabrics from wet and dry rot, mildew, fungi, and most boring insects, including termites. The preservative is carried in a volatile solution which is said to penetrate the fibers of the wood or fabric, filling them with the metallic salt. As the volatile vehicle evaporates, it leaves a metallic base in the fibers which is unpalatable to the insects and fungi spores.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 9.

Molded Joint Filler

A resilient non-extruding premolded joint filler is announced by the Servicised Products Corp., 6051 W. 65th St., Chicago, Ill. It is designed to serve two important functions: to keep the joint effectively filled, and to act as an efficient insulating material. Kork-Pak is recommended by the company for use between concrete floor slabs and footings of basementless houses and other buildings where a concrete slab rests on grade.

Kork-Pak is composed of cork granules bonded with asphalt and placed between two layers of asphalt-saturated paper. Its ability to recover its original thickness after compression permits it to keep joints filled throughout repeated expansion and contraction cycles, the manufacturer says. In addition, its waterproof and moisture-resistant components exclude moisture and vapor. Kork-Pak is supplied in ¼, ⅜, ½, ¾, and 1-inch thicknesses, in widths up to 36 inches, and in any length desired.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 61.

Sandal for Asphalt Work

Wood-sole sandals for asphalt workers are described in a catalog distributed by the F. J. Stahmer Shoe Co., Dept. F, 2439 Boies Ave., Davenport, Iowa. The Davenport paver's sandal fits over regular shoes and features a recess cut into the sole for the heel of the worker's shoe. A strap is adjustable to fit high or low instep. Soles are cut with a slight rock at the toe for added comfort and ease in walking.

The catalog illustrates and describes in detail the paver's sandal and other items in the Davenport line. It points out special features of each and tells the sizes each comes in. The catalog also contains information on the care of feet and a list of several advantages claimed for wood-sole shoes.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 51.

Koppers Purchases Freyn

Koppers Co., Inc., of Pittsburgh, Pa., announced recently that it had contracted to purchase the Freyn Engineering Co., Chicago, Ill. Freyn is a well known engineering firm which specializes in the design and construction of blast furnaces and open-hearth furnaces, and in the engineering of mills, power stations, and other steel-mill facilities. Freyn itself will continue under its present name, and for the time being will be operated as a wholly owned subsidiary of Koppers.

...ou more production more profit less maintenance!

TIME has brought many changes in machines and methods since the first Cedarapids Pre-Mix Asphalt Plant was setting records of 30 tons per hour . . . high production for the first portable plant of the 20's! Now the need for output as high as 100 tons per hour of accurately batched materials has resulted in the modern Cedarapids line of Bituminous Mixing Plants, known throughout the industry for their great capacities, low upkeep and low operation costs. Made up of matched screens, pugmills, batchers, elevators and other component parts, they are built for maximum efficiency, easy portability and economy. They produce a steady flow of thoroughly mixed materials.

30 tons per hour with the first Cedarapids Pre-Mix Asphalt Plant. Continuing research and the development of increasingly better machines have enabled Cedarapids to give you greater production of bituminous mixes at lower operating costs that assure good profits.

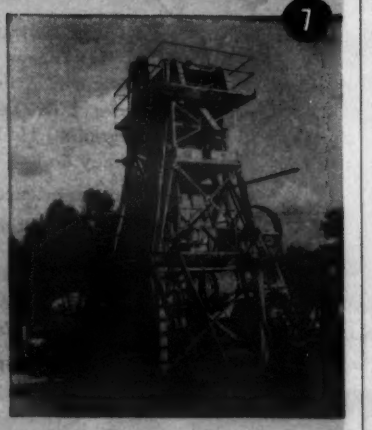
...NT BITUMINOUS MIXING PLANTS 1949

5 Cedarapids Model "E" Batch Type Bituminous Mixing Plant produced an average output of *700 to 800 tons per day* on an airport job that called for mixing 305,700 sq. yds. of flexible base and asphalt surface runways.

6 Model "FA" is the most portable Batch-Type Bituminous Mixing Plant in the Iowa line. Can be set up ready for operation in a few hours. This plant, operating in Ohio, produces *450 tons* of bituminous materials per day.

7 This Cedarapids 1000 lb. Model "A" Bituminous Mixing Plant produces a steady *200 to 250 tons per day.* Accurate batching, thorough mixing and simplicity of operation keep product quality high and costs low.

8 Cedarapids Patchmaster, a rugged, low-cost continuous-mix Bituminous Mixing Plant, produces *30 tons per hour and more* of uniform, thoroughly coated and mixed aggregate. This Patchmaster can be equipped with a 48" x 16' Cedarapids Drier and Dust Collector.



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IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U.S.A.

Gas Pipe Line Through Village

Utilities, Traffic, and Hard Digging Feature Installation of 12-Inch Main Near Los Angeles

By RAYMOND P. DAY,
Western Editor

✦ BESET by intercepted utilities, dogged by occasional hard digging and fast traffic, a 38-man crew of Pacific Pipeline & Engineers, Ltd., of Los Angeles recently finished the installation of 7,838 feet of 12, 8, and 4-inch gas main through the village of La Canada, Calif., about 13 miles north of Los Angeles. The $17,000 contract was done for Southern California Gas Co.

The new pipe line is a distribution feeder off the new 26-inch main "Big Inch" recently installed between the Texas Panhandle and southern California. The Pacific Pipeline job ties on to other work leading between Pasadena and the fast-growing residential villages of La Canada, Flintridge, and La Crescenta.

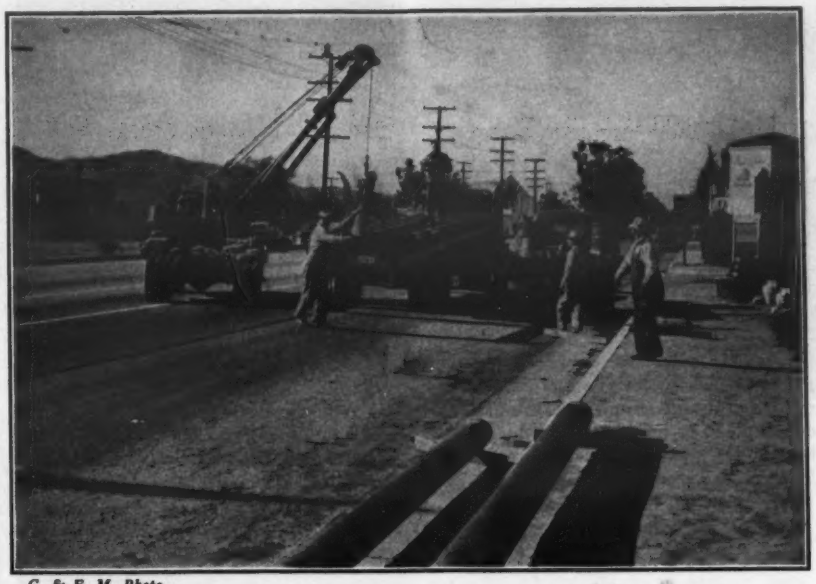
The job started at the easterly edge of La Canada and extended up Foothill Boulevard, the main street of the village, to its point of intersection with Verdugo Boulevard. The contract included hauling the pipe, trench excavation, and backfill, pipe welding, and clean-up work.

Pacific Pipeline & Engineers, Ltd., specializes in pipe-line work and is active on a great deal of it throughout southern California. Thus while the Foothill Boulevard project was somewhat routine, it was characterized by the good organization and sequence which has come to be typical of work done by this company.

Footages of pipe in the job included 6,016 feet of 12-inch; 1,720 feet of 8-inch; and 102 feet of 4-inch—all inside diameter.

Trench Excavation

Trench excavation was one of the first major items in the construction sequence. Because the job traversed State Highway 118 through its entire length, only 1,000 feet of work area was permitted to be opened up at one time. This meant that from the initial trench excavation to final backfill, operations had to be confined within a space of only 333 yards.



C. & E. M. Photo
A truck-mounted crane unloads a shipment of 40-foot sections of gas pipe for the La Canada job. After unloading, the pipe was strung out along the ditch line.

The pipe line was laid generally along the curb line on the north side of Foothill Boulevard. Paving consisted of asphaltic mat from 1½ to 3 inches thick, well weathered by age and traffic.

The edges of a 24-inch-wide trench were outlined first with yellow marking crayon. A compressor and pneumatic gad equipment then moved up. Two Thor 85-pound pneumatic drills were used, equipped with sharp pavement-breaking points. A Le Roi 210-cfm air compressor, mounted on a war-surplus truck, furnished power to the Thor drills.

A couple of workmen outlined the sides of the trench rapidly for a distance of about 50 feet, since the guns were hooked to the compressor with about 50 feet of 1½-inch hose. Then they re-

(Continued on next page)

15,000 V.P.M. in CONCRETE

Flexible shaft speed of only 3,600 r.p.m.

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International KB-7 with dump body

THE OWNER of this International KB-7 uses a dozen International Trucks in his engineering work. (Four are dump trucks, 2 flat beds, 1 oil spreader and 5 Concrete Ready-mix.) He knows what they can do, and how well they do it.

He speaks from experience when he says:

"The new KB-7 dump truck is a pleasure to drive, and has been getting 9½ miles to the gallon of gas under conditions which should use a good deal more—that is, a lot of starting and stopping and short hauls."

And we aren't exactly speaking as amateurs in the business when we tell you this:

International Trucks are the products of 42 years of real truck engineering. They are available in 22 basic models, 1000 truck combinations, gross weight ratings from 4,400 to 90,000 pounds—to give you the truck that's specialized right for your job. And, they're backed by the nation's largest exclusive truck service organization.

Talk to any International Truck owner. Talk to any International Truck driver. Then you'll know why it will pay you to see your International Truck Dealer for the very next truck you buy. Call him soon.

International Harvester Builds McCormick Farm Equipment . . . Farmall Tractors . . . Industrial Power Motor Trucks . . . Refrigerators and Freezers

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INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY · CHICAGO

C. & E. M. Photos

Using Thor pneumatic drills, workmen on the La Canada pipe-line job (above) break up asphaltic pavement over the ditch line. In the background is a Le Roi compressor. At right, a Ford tractor with a front-end loader scoops out excess excavation while a Cleveland trench digger moves on up the ditch line.

turned, simultaneously sank their gad points through the pavement in bites about a foot long, and pried. The asphaltic pavement turned up in big chunks, broken free, ready to load out.

A Ford rubber-tired tractor, equipped with a hydraulically controlled front-end loader and a rear-end scoop, then moved in. Using its front-end scoop, the machine loaded the broken pavement to the body of a 5-yard dump truck which hauled the material away to a dump. A crew of three men worked with this unit, keeping the broken pavement loaded clean without slowing down the tractor.

The trench excavation generally was 42 inches deep and 24 inches wide. It was handled by a Cleveland trenching machine powered by a Hercules engine. With the ditch already outlined, no elaborate care was necessary to keep the machine on line. A plumb bob was hung from the front end of the rig, centered on one edge of the ditch line, and kept there.

La Canada is criss-crossed by sewer lines, water lines, power lines, gas mains, and other utilities. Some of Foothill Boulevard has also been built up from random fill. Rocks, broken concrete foundations, and other such impedimenta are commonplace.

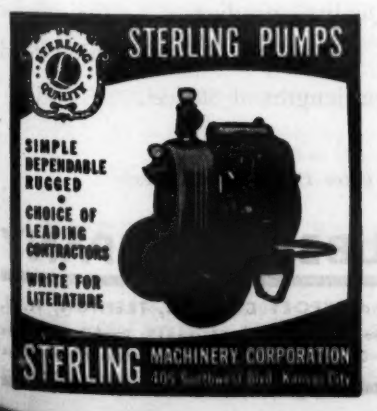
The power digger excavated trench to the point where these utilities were intercepted. Then the machine raised its rotating digger, skimmed the top lightly for about 10 feet, and resumed digging full depth. The block of dirt was then removed by a small hand-labor crew using pick and shovel.

Any pipe-line man, however, knows that maps are seldom too accurate about the location of utilities. It proved to be the case here. There were a few water and gas leaks when the machine dug into these existing utilities, but the companies sent service men out promptly to repair them.

Parts of the ditch were tougher. On the previous job, an open cut 18 feet deep and 24 feet wide at the top had been necessary to carry the pipe across a normally dry part of Devil's Gate Reservoir. At the end of this project, clamshell work was necessary to go down 15 feet on each side of a flood-control channel. Workmen then tunneled under this concrete box, and the pipe was laid in the tunnel.

Where the Angeles Crest Highway takes off from Foothill Boulevard to the north, 137 feet of street had to be kept open, and the gas line installed by drilling a hole 137 feet long from one side of the street to another. This work was done by Pacific Coast Boring Co. of Anaheim. Its rig consisted of a Ford gasoline engine which drove the rotary auger bit. A hydraulic jack was also used to jack the steel gas-main liner in

(*Continued on next page*)



Every Pound of Weight is on a Wheel
THAT DRIVES AND STEERS

That's Why These Graders Outperform All Others

Dominant in the field, these Austin-Western Power Graders owe their matchless performance to *completely effective* use of power. Through All-Wheel Drive, every pound of weight is a powered pound, harnessed to a driving wheel — and contributing every ounce to tractive effort. This tremendous traction — perfectly directed and controlled through All-Wheel Steer — provides superb earth moving ability, and mastery of all types of work from routine grading and ditching to operations never before possible with any motor grader.

Additional values are offered by specialized attachments—many exclusively Austin-Western — which greatly increase the usefulness and day-in and day-out profit making ability of the graders.

Power and control at all four wheels has been pioneered and perfected in grader application by Austin-Western. . . . The "88-H," "99-H," and Master "99" set performance standards unequalled in power grader history.

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Aurora, Illinois, U. S. A.

"88-H" Ditching around short radius curves is easy for an "88" or "99"— impossible with any other grader.

"99-H" All-Wheel Drive and Steer make it possible to slope banks beyond the reach of any other grader.

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BUILDERS OF ROAD MACHINERY
Austin Western
SINCE 1859

New Gas Pipe Line Goes Through Village

(*Continued from preceding page*)

place as the rotary bit sections bored the hole.

Because of these many conditions, it was almost impossible to get a good clear day's run, but nevertheless the trenching machine did make 1,000 feet one day in an 8-hour run.

Pipe Welded and Laid

Pipe was trucked to the job in pieces 40 feet long and strung out along the ditch line at the curb. The pieces were carefully protected, from their arrival on the job until they were in and backfilled. A Caterpillar D6 tractor with a Trackson side boom unloaded the pipe sections from the trucks. Canvas "bellybands" protected the sections during the lift, and they were placed on timber spreaders and sandbag softeners well off the ground when they were laid down. Generally the pipe sections arrived and were unloaded ahead of the ditch digging.

Insofar as possible, all welding was done above the ditch, on the street. Joints made in the ditch required special hand-dug holes to enlarge the ditch sufficiently to let the welders do their work.

Welders were first certified for their ability to make pipe-line welds; these are notoriously difficult because they range from conventional to overhead, with the welder sometimes almost standing on his head.

A Lincoln 200-ampere arc-welding machine mounted on a truck was used for all the welding work. In making a weld, the beveled ends of the pipe were filed bright to remove the rust. The 40-foot section was then picked up at its balance point by the Caterpillar-mounted side boom and carefully matched up to the end of the main pipe line. A shop-made clamp, lapping about 3 inches on each side of the joint, was then quickly tightened to hold the ends secure against movement.

Fleetweld No. 5 welding rod was used throughout for the welding; 5/32-inch rod was used to make the stringer bead, two rods being required to make the band around a 12-inch pipe. This weld was then carefully wire-brushed to remove slag, after which a filler bead of 3/16-inch Fleetweld rod was run.

The asphaltic insulation at the joint ends was peeled back to expose the pipe for a distance of 18 inches from each edge. This 3-foot section of insulation was replaced in the field, using hot asphalt and asphaltic paper wrapping. The hot asphalt was poured after being heated in a portable gas-fired kettle; it was worked around the underside of the pipe with a piece of asphaltic paper. About ⅛ inch of asphalt was applied, and an asphaltic paper wrapping was then applied while the asphalt was still hot. This made a continuous joint, perfectly protected against corrosion and ground acids.

The pipe was laid in the trench by making a lift with the Caterpillar-

(*Concluded on next page*)

C. & E. M. Photos

Welder Golden Mott (left) of Pacific Pipeline & Engineers, Ltd., welds steel gas pipe at a joint, while a Caterpillar-mounted side boom in the background positions pipe. Then workmen dress up the backfilled fine-graded trench, and, finally, a dump truck places hot-mix on the completed backfill.

**Joe gets a smooth ride since they equipped his tractor with Velvetouch All-Metal clutch facings and brake linings*

Smooth, positive performance. And longer service life, too. That's what you get with Velvetouch. Because Velvetouch is all-metal! It runs cooler to insure absolute operating uniformity . . . can't deteriorate like ordinary asbestos . . . and it won't rot in oil. Velvetouch costs less . . . when measured in terms of extra hours on the job! Specify genuine Velvetouch on your next replacement order, for only Velvetouch gives you all the plus advantages of all-metal construction.

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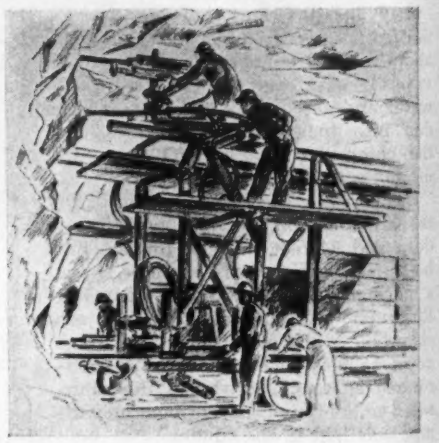

Goodall's finest large size air hose . . . especially designed for jumbos, caissons and other heavy-duty applications where reliability and safety are of prime importance. Built to stay *on the job longer* by withstanding continuous abrasive wear and damage from falling rock, tools, etc., KINKPROOF CONSTRUCTION assures a steady flow of air.

"Allgood Cord" is a "Standard of Quality" product . . . a designation warranted by years of outstanding service in the construction field. Made in 1½" to 4" sizes, in maximum lengths of 50 feet.

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Est. 1870

mounted side boom. Long lengths of continuously welded pipe were found to be quite flexible.

Backfill and Clean-Up

Working behind the laying crews, a small D4 Caterpillar with a hydraulically controlled angle-blade dozer scooped a very small amount of dirt in on the pipe—hardly more than enough to cover it well. This earth was then flooded by water from near-by hydrants so that it was forced to settle evenly around the bottom of the pipe.

The trench was filled to the top with earth pushed in by the angle-blade dozer. Since new pavement had to go in immediately where the ditch had been, high compaction was vital. A truck-mounted Emsco pavement breaker fitted with a tamping shoe went to work. When it had finished, considerably more dirt was needed to refill the ditch. The bulldozer pushed it in, and the Emsco machine made a final pass, backfilling the trench level with the top of the street grade.

The small Ford tractor then used its rear-end scoop to fine-grade the earth even with the bottom of the pavement prior to its replacement. This excess dirt was mucked off to one side and loaded out with all other debris and excess material, to be hauled ahead where needed or dumped in a disposal area.

Hot-mix asphaltic concrete then arrived in a dump truck. It was placed by straddling the ditch with the truck, hooking a small shop-made sweep with guiding handles onto the truck bed, and rolling slowly ahead. The sweep was fashioned so that it would distribute the material with a minimum of raking, at a fast rate.

The asphaltic material was then rolled down tight by an Austin-Western 10-ton tandem roller, and the truck returned to a near-by commercial hot plant for another load.

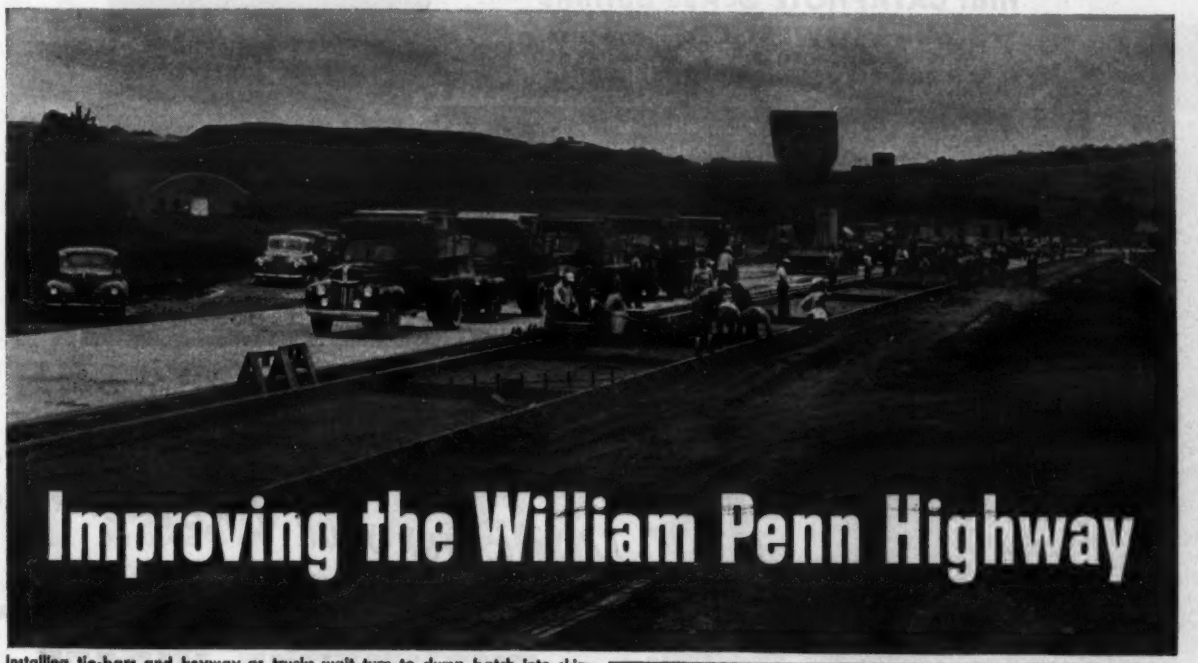
Pete Dahl was General Superintendent on the project for Pacific Pipeline & Engineers, Ltd., J. D. Skidmore was General Foreman, and V. J. Lewy represented the Southern California Gas Co.

Facts About Six-Wheelers

An interesting catalog on the construction and operation of six-wheel trucks and tandem-drive units has been compiled by The Timken-Detroit Axle Co., Clark Ave., Detroit, Mich. It discusses the various types of six-wheelers in use today, the types of tandem-drive units, types of final drives for tandem-drive units, and the design features of the Timken-Detroit tandem-drive units.

Bulletin SP-4805 groups the six-wheelers into two classes, articulated and rigid. It groups the tandem-drive units into through drives and inter-axle differential drives. And it discusses the final drives under two headings—single or double-reduction units. Drawings, photos, and text work together to make the catalog informative and interesting.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 104.



Improving the William Penn Highway

Installing tie-bars and keyway as trucks wait turn to dump batch into skip.

Left to right: Bruno Ferrari and John C. Slate, both of Latrobe Road Construction Co., with T. J. McKay, senior construction engineer, Pennsylvania Department of Highways.

As part of its far-reaching road-modernization program, the Pennsylvania Department of Highways recently authorized five miles of relocation on the William Penn Highway, at New Alexandria, Pa. The new road varies in width from two to four lanes. Included in its construction were two bridges and seven culverts. Contractor: Latrobe Road Construction Co., Latrobe, Pa. Steel piling, bar mats, dowel units, and cable guard rail were supplied by Bethlehem.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

STEEL FOR HIGHWAYS

Dowel Units • Reinforcing Bars • Bar Mats • Guard Rail Guard Rail Posts • Wire Rope and Strand • Pipe, Hollow Drill Steel • Spikes • Bolts and Nuts Timber Bridge Hardware • Tie-Rods Sheet- and H-Piling • Fabricated Structural Steel

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—And a big smile for the photographer! Willing hands lift Bethlehem Hinged Bar Mat at batching plant stockpile.

With Bethlehem Hinged Bar Mat in place, screw spreader goes to work on top course. Job used 300 tons of mats.

This reinforced concrete bridge has span of more than 53 ft, and will carry new highway over secondary road.

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Built to withstand the roughest air service in heavy construction, road-building, mining, quarrying; on compressors, pipe lines, hose lines. *Self-honing* provides a permanent, leak-proof seal. Handle and plug combined within the valve body—*handle can't come off.* Valves are quick-opening, self-adjusting, and do not require packing. Straight, full flow in open position assures maximum capacity. Male or female both ends, sizes ½" to 2". Cadmium plated—rustproof.

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N. B., Cash, check or postage stamps will be entirely acceptable.

Convention Calendar

July 13-15—ASCE Meeting
Summer meeting, American Society of Civil Engineers, Hotel Del Prado, Mexico City, Mexico. Don P. Reynolds, Assistant to the Secretary, 33 W. 39th St., New York 18, N.Y.

July 17-20—County Officials Meeting
Annual meeting, National Association of County Officials, Hotel Leamington, Oakland, Calif. NACO Housing Committee, Oakland, Calif.

Sept. 25-Oct. 2—Construction Exposition
Construction Industries Exposition, Houston Chapter, Associated General Contractors of America, Inc., Sam Houston Coliseum, Houston, Texas. L. W. Duddlesten, General Manager, or Russell W. Nix, Chairman, Exposition Committee, AGC Office Bldg., Gray and Crawford Sts., Houston, Texas.

October 3-5—Lubrication Meeting
Annual meeting, National Lubricating Grease Institute, Hotel Roosevelt, New Orleans, La. Harry F. Bennetts, Executive Secretary, 4638 Mill Creek Parkway, Kansas City 2, Mo.

October 10-14—AASHO Meeting
Annual meeting, American Association of State Highway Officials, Gunter Hotel, San Antonio, Texas. Hal H. Hale, Executive Secretary, 1220 National Press Bldg., Washington 4, D.C.

October 24-28—National Safety Congress
National Safety Congress and Exposition, National Safety Council, Stevens, Congress, Morrison, and Sherman Hotels, Chicago, Ill. R. L. Forney, General Secretary, National Safety Council, 20 N. Wacker Drive, Chicago 6, Ill.

Highway Guardrails Features Safety Top

A deep-beam type of highway guardrail is available from United Steel Fabricators, Inc., Wooster, Ohio. Among the features claimed for the Barrier-Beam guardrail are low erection and maintenance cost, and wide adaptability. The rails are designed to provide a minimum tensile strength of 80,000 pounds for the rail element and joints.

Another feature of the Barrier-Beam is its non-cutting rounded top edge. The rails are made from high-carbon-steel sheets with a minimum thickness of 12 gage. The rail plates are taper-corrugated longitudinally, and form a section with a minimum width of 12 inches and a depth of 3 inches. The splice and post bolts used for fasteners are ⅝ inch in diameter, and have oval necks and shallow rounded heads. For nighttime safety, reflector buttons can be inserted in a row of uniformly spaced holes running along the center of the rail.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 116.

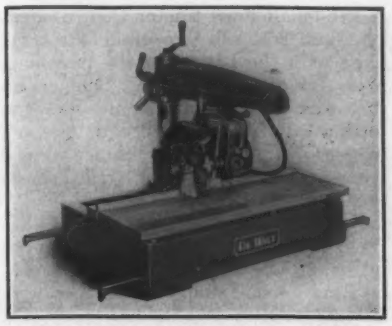
Three Named by Twin Disc

Three personnel changes are announced by the Twin Disc Clutch Co., Racine, Wis. Wade A. Eskridge is appointed Service Manager at Racine, Wis. Jack N. Yetter is named District Sales Engineer in charge of the Tulsa office. And Harry T. Peck is promoted from Installation Engineer to District Sales Engineer operating out of the Dallas office.

Woodworking Machine

An all-purpose low-priced saw machine is made by DeWalt, Inc., 210 Martha Ave., Lancaster, Pa. It is especially designed for use in highway-maintenance shops and small tool shops. It features a 1-hp electric motor driving a 10-inch-diameter saw blade.

The travel head is mounted on four heavy-duty ball-bearing rollers and rides on machined tracks inside the arm. It has mechanical aligning adjustments at all moving positions. The new DeWalt Model GW saw machine can be used as a cut-off saw, miter saw, rip saw, tilting arbor saw, double-miter saw, and as a variety saw. Special attachments increase its use as a dado machine, gaining machine, grooving machine, rabbeting machine, and as a shaper.



DeWalt's new Model GW saw machine was designed especially for a variety of woodworking operations in a small shop.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 58.

New Goodall Denver Branch

Goodall Rubber Co., Trenton, N. J., has opened a branch sales office at 1033 Santa Fe Drive, Denver 4, Colo. Henry Walker, who has headed the Chicago branch for several years, will be in charge. Stocks of items in the Goodall line of hose, packing, clothing, and footwear will be warehoused, with belting and other products quickly available from the factory.

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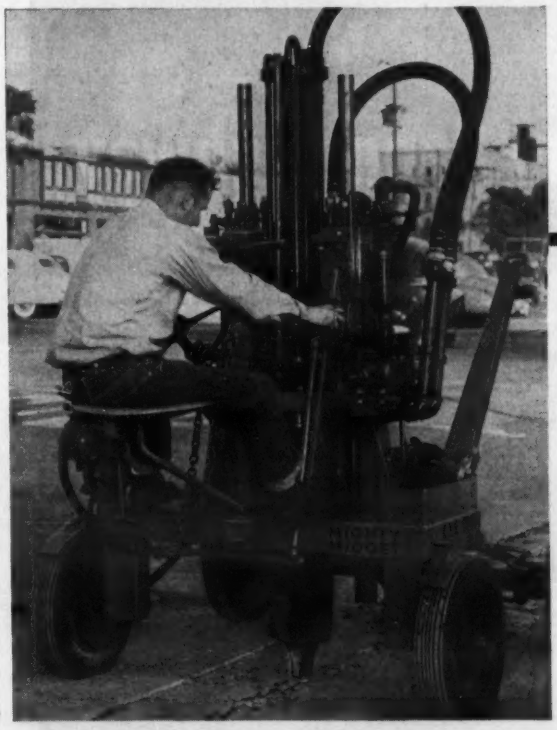

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A utility machine with merit, power, speed and economy. Increases output of your compressor. Cuts concrete and tamps backfill at a rapid pace. Cuts costs to a minimum. Entirely air powered. Cuts concrete the easy way.

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Owen Type DX Extra Heavy Duty Buckets are ideally suited for under water dredging operations. Sealed, grit-proof bearings are impervious to water and abrasive materials. Proper shell curvatures assure complete and rapid discharge of wet, sticky clay and sludge.

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C. & E. M. Photo
Here a Raymond pile-driving rig puts down an H-beam pile for the footing at pier T11. V. Barletta Co. sublet this work to Raymond.

High-Level Bridge To Span Mystic River

(*Continued from page 3*)

piers, S-1 and S-2, for the substructure of the Little Mystic Channel span. The piers were built on land, just back from the bank of the channel, and are supported on steel H-piles. The contract included 1,530 cubic yards of excavation; 920 cubic yards of wet excavation; furnishing and driving 15,195 linear feet of steel H-piles; 393,000 pounds of reinforcing steel; and 4,010 cubic yards of concrete.

The same company was also awarded Contract 4A, on a low bid of $501,300, to build the concrete substructure for the toll-plaza tower, and for all the land piers between the channel and the river on the B. & M. Railroad yard. Six footings were constructed for the steel tower. The land piers are eleven in number, from T1 to T11 inclusive, and consist of concrete pedestals supported on steel H-piles. The pedestals form a base for the steel column bents included in another contract. These bents have spans up to 116 feet in length.

Contract 4A also included the construction of main-span pier M1 which is located on land. The V. Barletta Co. sublet all its pile-driving work to the Raymond Concrete Pile Co. of New York. At the time the project was visited, a Raymond oil-burning crawler-type driving rig was engaged in driving 18 piles for the footing at pier T11. The rig was equipped with 96-foot steel leads and a Vulcan No. 2 steam hammer. This particular foundation required 14-inch steel H-beam piles, 140 feet long, spaced on 3½-foot centers. The usual procedure was to drive an 80-foot section first, until only the last few feet were projecting above the ground. Then a 60-foot section was spliced to it with three 10 x 10 x ⅝-inch steel plates, a plate on each flange and the third plate on one side of the web. The pile was then driven to refusal.

Main Substructure Contract

Contract 4B, principal substructure contract on the project, included the construction of the three river piers, M2, M3, and M4, for the main channel span in the Mystic River. This contract went to Merritt-Chapman & Scott Corp. of New London, Conn., on a low bid of $1,674,200. Work on these piers, which will be described in detail further on, got under way in May, 1948, and was

(*Continued on next page*)

J. E. Greiner Co. Photo
Heavy framing braced the deep sheet pile cofferdams in which the river piers were constructed. This is a view of the cofferdam for pier M4.

Glued laminated beams in ultra modern service department of Francis-Hopkins Motor Company, Portland, Ore. Beams and ceiling are painted for better lighting. Architect is Richard Sundeleaf, A.I.A., Portland.

When your plans call for moderately wide spans without posts and supports, and appearance requires a generous touch of distinction, you have a logical use for Timber Structures glued laminated beams.

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massive strength
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These beams, substantially stronger than sawn timbers of equal size, are formed from structural quality Douglas fir, which is kiln dried, precision milled and "welded" together through glued lamination. They will not shrink, check, twist or warp.

Beauty for the Distinctive Touch! Through glued lamination, beams of any size can be produced, and architectural effects of massive beam construction once more are available. All decorative effects are possible...clear finish...stain...paint.

Further information about these new and better materials is contained in folder "Glued Laminated Structural Members". Get a copy from the Timber Structures office nearest you, or write us for it.

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Offices in Boise, Idaho; Eugene, Oregon; Lawrenceville, N.J.; Chicago; Dallas; New York; Seattle; Spokane.
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The LULL SHOVELOADER . . . a year around profit-producer . . . cuts costs over a wide range of loading operations.

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THE WORLD'S LARGEST LINE OF *Allied Equipment*
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High-Level Bridge To Span Mystic River

(*Continued from preceding page*)

completed in April, 1949. The piers were constructed in open cofferdams which were sealed with tremie concrete and then unwatered, thus permitting the reinforced-concrete pier stems to be built in the dry. Their sides are protected against abrasion from ice and debris by granite facing which extends above and below extreme tidal range. The granite is 20 feet in height, from elevation minus 8 to plus 12.

All three piers are in the water, and are founded on bedrock. Bedrock at the bridge site is typically a rather fine-grained rock, dark bluish gray to brownish gray, composed chiefly of argillaceous material generally called Cambridge slate, although it is not a true slate. Above the rock is boulder clay or hardpan, modified till, blue clay, and alluvial deposits. Pile foundations are required wherever blue clay occurs in any considerable thickness. At these piers the clay strata were shallow enough to be excavated without too much difficulty, along with the other overlying material.

Other Contracts

Two other contracts covered substantial substructure work. Contract 5 included the building of nine piers, C1 to C9 inclusive, at the Chelsea end of the project across the grounds of the U. S. Naval Hospital. The M & R Construction Corp. of Boston was awarded this contract on a low bid of $200,994.

At the other side, or Charlestown end of the project, the approach from Boston is much longer. It includes 31 piers, B1 to B31, laid out with spans averaging from 80 to 109 feet. They extend from Wapping Street in Charlestown to the Little Mystic Channel. Six of these concrete piers are supported on steel H-piles, but the others are founded on suitable bearing material, either sand or gravel. The Gahagan Construction Corp. of Boston, Mass., is handling this contract on a low bid of $685,472.

The four main steel superstructure contracts went to two different companies. Contracts 3A and 3D, involving 24,213,000 pounds of steel, were awarded to the Bethlehem Steel Co. of Bethlehem, Pa., for a total bid of $4,681,584. Contracts 3B and 3C, involving 31,817,000 pounds of steel, were awarded to the American Bridge Co. of New York City on a total bid of $6,142,240. On the four contracts the steel totaled 56,030,000 pounds, and the bids added up to $10,823,824.

Contract 3A takes in the south half of the toll-plaza tower, and proceeds southward across the Little Mystic Channel and over the Boston approach as far as pier B23. Contract 3C picks up at this point and takes in the remainder of the approach out to Wapping Street in Charlestown. Contract 3B includes the north half of the toll-plaza tower, and advances in the opposite or northerly direction across the main Mystic River span until pier C9 is reached on the Chelsea approach. The rest of this approach to its northerly terminal at Fourth Street, Chelsea, is under Contract 3D. The first steel to be erected was on the toll-plaza tower, under Contract 3A, during September, 1948. The entire superstructure is scheduled for completion by November 30, 1949.

Other contracts include borings; approach facilities at both ends including fills and surface-street improvements; superstructure paving; underpasses to complete the approaches; roadway lighting; removal of old bridge; dredging; and the construction of seven new units of officers' quarters at the U. S. Naval Hospital on the Chelsea side, to replace similar units that were moved for the new bridge. The dredging contract includes widening the channel under the main river span, and deepening it to elevation minus 30. The present channel is confined to the opening at the swing span.

Three River Piers

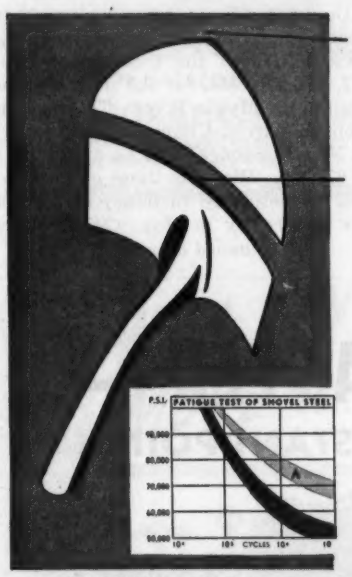
The three river piers constructed by the Merritt-Chapman & Scott Corp. are numbered M2, M3, and M4 from south to north across the Mystic River. All three piers were built with seals, topped by a solid pier rising 15 feet 5 inches above water. Out of the pier two concrete shafts are built, joined together at the top by a concrete cap which supports the steel, and by an intermediate beam for stability. An idea of the size of these three piers may be obtained from the following data:

	M2	M3	M4
Bottom of seal (elevation)	−85	−63	−30
Top of seal (elevation)	−50	−36	−10
Top of solid pier (elevation)	+20	+20	+20
Top of shafts (elevation)	+132	+132	+110
Seal dimensions (in feet)	82 x 35	82 x 35	72 x 28
Pier dimensions (in feet)	78 x 31	78 x 31	66 x 22

(*Continued on next page*)

C. & E. M. Photo
This temporary piling driven in Little Mystic Channel will support the steel falsework for the Bethlehem Steel Co. section of the bridge superstructure.

you're *guaranteed* more service from
"surface peened" RAZOR-BACKS



Look at the cutting edge of any RAZOR-BACK shovel and you'll see that the blade is 60% thicker in the center than at the sides.

This strong center *backbone* of 13 gauge steel extends the full length of the shovel — resists wear at the cutting edge, reinforces the frog where ordinary shovels tend to break, and forms a rigid, extra-long socket for the handle.

Yet the tool weighs no more, because we taper the sides to 17 gauge, where shovels never wear out or break.

"Surface Peened": Modern cold-working process, following heat treatment, makes RAZOR-BACK steel 2½ to 5 times tougher to resist the constant bending that makes ordinary shovels break.

All RAZOR-BACKS are deep hung, perfectly balanced. Send for Catalog, prices and name of our nearest distributor.

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Four gallon capacity. Fully insulated. Will maintain water temperature within ten degrees for twelve hours in the hottest weather.

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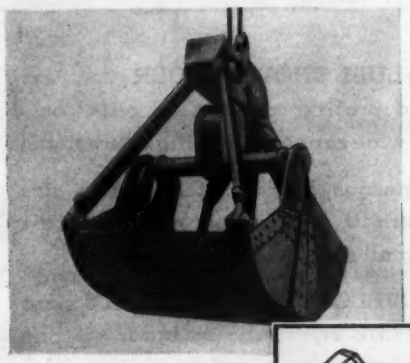
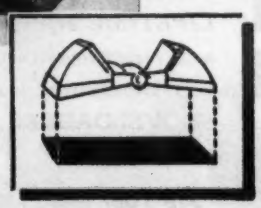
2855 N. FOURTH STREET - PHILADELPHIA 33, PA.

ERIE *Barge Type* Bucket



In this type the large deck area achieved means bigger payloads in stock piling and barge rehandling work. Erie's booklet on 2-line buckets gives you complete data on this type and 3 other classes of Erie Buckets. Write for copy today.



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¾ Yd.	27.21 Sq. ft.
1 Yd.	30. Sq. ft.
1¼ Yd.	32.3 Sq. ft.
1½ Yd.	38.7 Sq. ft.
1¾ Yd.	42.4 Sq. ft.
2 Yd.	45.1 Sq. ft.
2¼ Yd.	53.5 Sq. ft.
2½ Yd.	57.6 Sq. ft.
3 Yd.	69.9 Sq. ft.

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ERIE
STEEL CONSTRUCTION COMPANY
296 GEIST ROAD • ERIE, PENNSYLVANIA

On piers M2 and M3 the shafts are 17 feet 5¼ inches square at the bottom and taper to 9 feet 3 inches square at the top, where they are connected by a cap 12 feet 6 inches high and the same width as the shaft columns. Halfway up, the shafts are tied together by a concrete beam 12 feet 6 inches high x 8 feet wide. Pier M4 shafts measure 11 feet 7½ inches x 13 feet 7½ inches at the bottom and 6 x 8 feet at the top, and are joined by a cap 8 feet deep and the same width as the shafts. The cross beam halfway up is 8 feet high x 6 feet 6 inches wide.

The same general procedure was followed in the construction of all three piers, which were completed in this order: M4, M3, and M2. Because of the great depth to which piers M3 and M2 went down, the overlying material was first removed, almost to the foundation rock, by dredging. This was done under a subcontract by the Great Lakes Dredging Co. using its dipper dredge The Crest, equipped with a dipper handling 16 to 18 yards.

Deep Cofferdams

Timber guide piles were then driven at the site of the cofferdam, and a wooden frame template was set in place as an outline for the steel sheet piling sides. The sheeting varied in the different cofferdams. In M4, Bethlehem ZP32 sections, 40 feet long, were used. For M3, Carnegie MC32 sections, 75 feet in length, were required. Carnegie MC38 sheeting was driven in the M2 cofferdam where 98-foot lengths were necessary; this great length was attained by splicing 74-foot and 24-foot sections. The sheeting was driven by McKiernan-Terry hammers, either a 10B3 or a 9B3, without the use of leads. The hammers were handled by derrick lighters whose boilers provided the steam.

Merritt-Chapman & Scott Corp. had its usual adequate fleet of floating equipment on hand. This included two derrick lighters, Cincinnati and Warren. The Cincinnati measures 110 x 40 x 10 feet, and has a 154-foot boom with a capacity of 20 tons. Its coal-burning boiler is 60-hp. The Warren dimensions are 90 x 36 x 10 feet. It is a 15-ton derrick with an 85-foot boom; also a coal burner, its boiler is rated at 75-hp. Both lighters have wooden hulls. Doing the same work as a lighter was the wooden scow Active, 100 x 40 x 10 feet, on which was mounted a Manitowoc 3000 Speedcrane with an 82-foot boom.

Among the work boats was the No. 3, a covered lumber scow measuring 90 x 35 feet; No. 54 and No. 58, 80 x 35-foot scows used for holding forms, steel, cofferdam framing, etc.; the 80 x 32-foot steel pontoon scow Army; and a dump scow with a 250-yard capacity.

After the heavy framing for the cofferdam was assembled, two other lighters were procured for lowering it into position, for one section weighed as much as 90 tons. For this especially heavy handling, the contractor engaged the services of the U. S. Navy lighter No. 77 and the Charles Hazelton Co.'s lighter Judith. When the piers were completed, the sheeting was removed with a Vulcan 800C extractor.

Heavy Framing

The heavy framing to brace the deep sheet pile cofferdams was fabricated by the Bethlehem Steel Co. and shipped by rail to the job site; there the steel members were assembled into rings and lowered into position. For piers M2 and M3, the cofferdams were the same size—82 feet 6 inches x 35 feet 6 inches. M2, which went down to minus 85 elevation, required five rings for bracing, while M3, which went down to minus 63 elevation, needed but four rings. The total weight of the framing for M2 was 165 tons, and for M3, 110 tons.

In the M2 cofferdam the five rings

(Continued on next page)

This machine is alternating between pouring to forms and loading concrete buggies. No ramps or cranes required.

HOW WOULD YOU DO THESE JOBS?

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Feeding two Pumpcretes on a sewer job.

(ABOVE)
Loading a concrete truck on a subway job.

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THREE SIZES
27-E Singlemix (Single drum)
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SELLING USED EQUIPMENT?
Advertise it in the "TRADING POST"
See pages 109, 110 and 111

High-Level Bridge To Span Mystic River

(*Continued from preceding page*)

were at the following elevations: minus 73, minus 40.5, minus 29, minus 13, and plus 7; the top of the sheeting is at plus 9. The first ring at minus 73 consisted of a single 24-inch WF 120-pound wale, cross-braced with five 12-inch 53-pound BP sections. At minus 40.5 and minus 29 the rings were similar, consisting of double 24-inch WF 120-pound sections for wales, and cross-braced with five 14-inch WF 103-pound sections. The ring at minus 13 was a single 24-inch WF 145-pound wale with five 14-inch 73-pound BP sections for cross-braces. The top ring at plus 7 was a single 12-inch 53-pound BP wale that was cross-braced with five 8-inch WF 28-pound sections.

The bottom two rings, with a total weight of 75 tons, were coupled together and hung as a single unit from the top of the cofferdam by six 1-inch cables—three cables to a side. The lowest ring remains in the seal concrete, as do the 8-inch WF 17-pound steel vertical posts that fit between the wales at each cross member. The three upper rings, with a combined weight of 90 tons, also are coupled together as a single unit which is bolted to the sheeting at plus 7 with a ⅞-inch bolt at every other sheet pile. For vertical posts in the upper unit, 10 x 10 timbers were employed, three such posts going under each cross member.

In the cofferdam for pier M3, the lowest ring, weighing 20 tons, was placed as a single unit at elevation minus 50. The remaining three rings at elevations minus 26.5, minus 13, and plus 7 weighed 90 tons when they were coupled together. The top of the sheeting in M3 was also at elevation plus 9. The frames were assembled by welding; there were four Hobart 300-amp electric welders on the job.

Cofferdam Excavation

Along with the placing of the rings, the cofferdams were excavated with clamshell buckets from the lighters or crawler crane. Digging equipment included two Owen heavy-duty 2-yard buckets, and two Williams clamshells—a 1½ and a 1-yard bucket. When the framing was completely installed and the clamming finished, the bottom of the hole was thoroughly cleaned out down to bedrock before the seal was poured. This was done by a combination of jetting and air lift through a discharge pipe. The hose and pipe were supported from the boom of the crawler crane mounted on the barge moored alongside the cofferdam.

A Jaeger 4-inch jet pump forced water through a 2½-inch jet hose which was reduced at the end to a 1-inch opening. Operating at 200 pounds of pressure, this jet loosened the heavy material from the bottom and forced it in the direction of the air lift. The air lift consisted of a 95-foot length of 12-inch-diameter pipe that extended down to the bottom of the hole, with its upper end elbowing out over the side of the cofferdam to discharge material. The material was lifted up this pipe by air pressure, hence the term "air lift". Compressed air was released from a receiver tank into which it had been pumped by an Ingersoll-Rand 500-cfm and a Chicago-Pneumatic 300-cfm compressor, and delivered to the bottom of the discharge pipe through two 1-inch hose lines.

These air lines turned up on the inside of the large discharge pipe and furnished the pressure to force heavy material to the top. The pressure was sufficient to pick up a 10-inch-diameter stone and send it to the surface. Three shifts of divers were employed in these clean-up operations. They jetted the material to the air lift, and also directed the movement of the big pipe around the cofferdam. After the material had been removed down to the bare rock, preparations were made for pouring the concrete for the seal.

Concrete Operations

Seal concrete was poured under water, right up against the sides of the steel sheeting. There was no room at the job site to set up a concrete batch or mixing plant, so all concrete was delivered to the bridge in truck-mixers by the Boston Sand & Gravel Co. The haul from its plant in East Boston was 1½ miles. As many as 16 trucks were used during the large seal pours.

In pouring pier M4, which is near the north end of the existing bridge, the truck-mixers ran out on the old span during the seal pour. The concrete was discharged into two tremie hoppers, 5 feet square at the top and tapering to a 12-inch circular opening at the bottom, to which 12-inch discharge pipe was attached. The seal pour progressed at the rate of nearly 120 cubic yards per hour.

When the seal was finished, the cofferdam was unwatered by Jaeger and Marlow 6-inch pumps, and the laitance was cleaned from the top of the concrete. An 8-foot-high distributor block was poured next above the seal. When this was in, a support was provided for blocking against the sheeting, permitting the removal of a wale ring near that elevation. Forms were then constructed

(*Continued on next page*)

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FOR PERFECT TRAFFIC LINES:

AIR CURTAINS, basic feature of all Kelly-Creswell Equipment, make possible the application of clean-cut, attractive lines *without* coming in contact with the surface.

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Sturdiest Pull-Type now on the market. An extra fine Terracer. Will complete over a mile of normal terrace per day. This machine will surprise you in what it will do.

Will dig or clean ditches, cut sod and rebuild a mile of town road per day, ready for the gravel. Can be supplied with front control for one-man operation. No sore customers with the "HUSKY."

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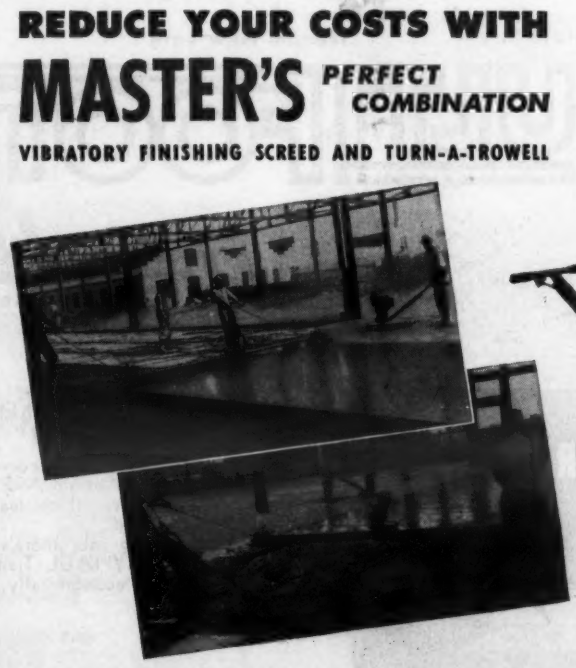
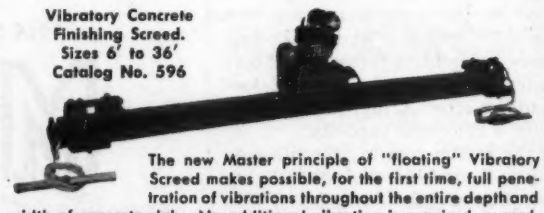


A perfect combination for striking-off, vibrating, floating, and finishing concrete floors. Increase your profits by using harsher and more economical mixes and at the same time obtain denser, more accurate, and harder wearing surface concrete.

Vibratory Concrete Finishing Screed. Sizes 6′ to 36′ Catalog No. 596

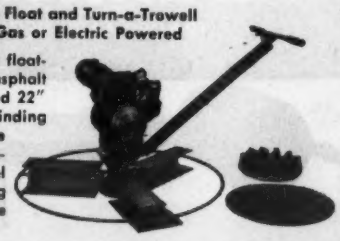


The new Master principle of "floating" Vibratory Screed makes possible, for the first time, full penetration of vibrations throughout the entire depth and width of concrete slabs. No additional vibration is required, regardless of the concrete slump or the amount of reinforcing steel used.

Turn-a-Trowell Sizes 34" or 48"—Gas or Electric Powered Write for Catalog No. 685

For floating and finishing concrete floors, etc. manufactured in two sizes—34" and 48" gasoline engine or electric motor driven. Only Master provides instant change of trowels from floating to finishing with a single machine.

Combination Disc Float and Turn-a-Trowell 48" size only Gas or Electric Powered



For high speed 24" disc floating of concrete and asphalt mastic floors and 16" and 22" grinding heads for grinding floors. This same machine performs the same operation of a Turn-A-Trowel by merely substituting Turn-A-Trowels for the 24" Disc.

MASTER VIBRATOR COMPANY • 125 DAVIS AVENUE • DAYTON 1, OHIO

for the piers. They were made from 1¼-inch boards lined with ¼-inch plywood, and backed with 3 x 6 studs on 14-inch centers and double 3 x 6 wales on 2-foot 6-inch centers. Richmond ties were placed on an average 2-foot 6-inch spacing. The forms were built on the work scows and lifted into place by the booms of the derricks or the crane.

Above the seal the concrete was reinforced with Bethlehem rods. On M4 the concrete was discharged from the truck-mixers into two Blaw-Knox 3-yard bottom-dump buckets which were lifted to the forms by the booms on the equipment. As the concrete was placed, it was vibrated with Mall vibrators.

For placing concrete in piers M2 and M3 the procedure varied somewhat, since the truck-mixers could not get close enough to these two piers from the old bridge. A Rex 8-inch Pumpcrete machine with a 2-yard hopper was set up on one side of the old bridge and as close as possible to the pier being poured. The truck-mixers discharged their contents into the Pumpcrete hopper, and from there the concrete was moved along to the forms. The largest continuous pour on the job was for the seal of M2 which totaled 4,000 cubic yards. On this pour, concrete was placed at the rate of 120 yards per hour.

Steel Erection

The Bethlehem Steel Co. began work on its two major contracts with the erection of the toll-plaza tower. Material was shipped from Pottstown, Pa., to the B. & M. Railroad yard between the river spans. There it was unloaded, and the lower members were erected with the help of two Bay City industrial locomotive cranes. These rigs had capacities of 50 and 75 tons, and were equipped with various booms ranging in length from 70 to 100 feet. The tower measures roughly 115 x 45 feet, and is 140 feet high. When the 60-foot level was reached in the tower, the locomotive cranes set up a guy derrick at that height. The derrick had a 100-foot boom and a 110-foot mast and was secured with eight guys—four to the ground and four to points on the already completed portions of the tower.

When the steel was erected at the top of the tower, a smaller stiffleg derrick was set up on the upper level and guyed to the structure and also the ground. This derrick had a 70-foot boom and an 80-foot mast, and handled the remainder of the steel work in the tower; the big derrick was dismantled. All the superstructure was riveted with either ⅞ or 1-inch rivets. Three 4-man riveting crews worked on the tower; air for the riveting guns was supplied by a Worthington Blue Brute 350-cfm compressor which pumped into a receiver. The top girders in the tower weighed 40 tons.

From the tower, the steel in the bridge superstructure was erected by a stiffleg traveler with a capacity of 85 tons and a 125-foot boom, which moved ahead on two standard-gage railroad tracks placed on 20-foot centers. As the cantilever sections were run out and the cross beams set in place, the tracks were extended for the traveler. Not until the Little Mystic Channel was reached was any falsework required. Then temporary pile bents were driven in the channel to support the steel falsework for the superstructure. Some of these larger bents contained as many as 44 separate piles, which were first assembled on a barge in the form of a cage, and then spotted in position from a revolving-crane boat. The bents were constructed on an average of 70-foot centers across the channel.

Quantities and Personnel

The major items in Contract 4B for the construction of the three main river piers built by Merritt-Chapman & Scott Corp. included the following:

Wet excavation	18,100 cu. yds.
Tremie concrete	7,190 cu. yds.
Concrete (placed in the dry)	17,520 cu. yds.
Reinforcing steel	720,700 lbs.
Granite facing	21,992 cu. yds.

Merritt-Chapman & Scott Corp. was represented on the Mystic River Bridge pier construction by Harold Jenkins, Superintendent, and Jesse Corner, Assistant Superintendent. Charles R. Richardson is Project Manager and A. M. Heaton is District Manager.

Other contractor's representatives in-

(*Concluded on next page*)

C. & E. M. Photo

Harold Jenkins (left) was Superintendent on the Mystic River Bridge pier construction for Merritt-Chapman & Scott Corp. Elmer J. White is Resident Engineer on the project for J. E. Greiner Co.

It takes fast and accurate driving to win the famous speedway classic. On construction jobs, the fast and accurate driving you get with ARMCO Steel Sheeting is also a winner. Jobs are done quickly and at low cost.

Light weight and a small displacement area make ARMCO Sheeting easy to handle and drive. The work goes fast with either a hand maul or a power hammer. You'll find that ARMCO Steel Sheeting can generally be driven to penetration before excavation.

On temporary jobs, ARMCO Sheeting can be readily pulled and re-used over and over again. A convenient hole near the top of each section facilitates pulling. Storage is no problem because the individual units nest together to save space.

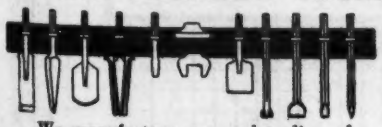
You'll like ARMCO Steel Sheeting as a cost-cutting, work-speeding tool on a wide variety of jobs. It is ideal for shoring trenches, building core walls and cofferdams, shore protection and similar uses. Flange and interlocking types are available in lengths from 6 to 20 feet or more.

Write for complete data on ARMCO Sheeting today. Armco Drainage & Metal Products, Inc., 2635 Curtis Street, Middletown, Ohio. Export: The Armco International Corp.

ARMCO STEEL SHEETING

"BICKNELL BETTER BUILT"

PAVING BREAKER TOOLS



We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

Write for descriptive circular

BICKNELL MANUFACTURING CO.

12 LIME STREET ROCKLAND, MAINE

High-Level Bridge To Span Mystic River

(*Continued from preceding page*)

clude H. A. DelGrosso, Superintendent for the V. Barletta Co., and Ivan A. Shook, Superintendent for the Bethlehem Steel Co.

Elmer J. White is Resident Engineer for the J. E. Greiner Co. of Baltimore, Md., the consulting engineers who designed the entire structure and are supervising the construction.

The Mystic River Bridge Authority is headed by Ephraim A. Brest, Chairman; Edmund E. Capodilupo is Secretary-Treasurer. The proposed tolls on the bridge will be 15 cents for passenger cars and a maximum of 40 cents for trucks, according to their weights. Passenger-car tickets will probably sell at the rate of ten for $1.00.

According to Chairman Brest, the Mystic River Bridge is the first revenue-bond financing project in the history of the Massachusetts Commonwealth, and is founded upon the fundamental principle of "let the user pay". It is intended to serve as a model for financing future projects in the metropolitan Boston area for the relief of traffic congestion, and the construction of other needed public improvements.

Experts have estimated that traffic over the bridge will exceed the traffic over such metropolitan New York City toll crossings as the George Washington Bridge, the Henry Hudson Bridge, and the Lincoln Tunnel. It is expected that sufficient revenue will be received in tolls to retire the $27,000,000 worth of revenue bonds in about 20 years. The bridge will then become a part of the Massachusetts state highway system, and will be free of tolls.

Data on Protective Coat For Concrete-Curing Use

A protective mat for curing concrete surfaces is described in a bulletin issued by L. Richard & Co., Inc., 418 N. Leavitt St., Chicago 12, Ill. The Centraline road coat combines waterproof Kraft paper and burlap on a strong paper backing. It is delivered sewn to size, and requires no special treating of the surface, Richard & Co. reports.

The catalog points out the features of the Centraline road coat, with emphasis on its durability and economy. Photographs show how the mat is spread on the wet concrete, how it seals in moisture, how it looks when in place, and how it is removed.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 27.

Traffic-Line Painting

Traffic-line painting machines of the type pushed by one man are described in literature prepared by Samuel & Hirschberg, 204 Valentine St., Hackettstown, N. J. These machines are especially recommended by the manufacturer for use in marking traffic lanes and safety areas.

The catalog points out that the Streme-Liner has an adjustable line-width mechanism which permits it to paint lines 3 to 8 inches wide; that it blows dust and dirt away from the path of the paint; that it can paint to within 6 inches of a head-on obstruction; that it lays long straight lines or curved lines; and that it has a paint capacity of 3,000 linear feet of 4-inch line, a self-adjusting mechanism, a specially designed spray-gun tip, and a paint-shield control and locking handle.

The catalog pictures the types of lines the Streme-Liner can paint, and close-up shots show the features which are described in the text, the 180-pound gasoline-powered Model 401, and the 175-pound electrically-powered Model 411. Also described in detail are the 4-cylinder compressor and the special Streme-Liner paint sprayer which can be used independently of the striper.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 33.

Rotary Concrete-Drill Bit

A 4-page two-color catalog containing complete data on the Tilden line of rotary concrete-drill bits has been issued by the Tilden Tool Mfg. Co., 1995 N. Fair Oaks, Pasadena 3, Calif. Drills listed in the catalog range from ¼ inch to 4 inches in diameter and from 5 to 18 inches in length. Extra shanks up to 36 inches long are also available.

The catalog contains a full account of the Tilden rotary drill, which is designed to penetrate concrete at speeds of up to 6 inches per minute. It also includes general information on concrete drilling.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 98.

FOR FAST, EFFICIENT, SAFE, LABOR SAVING REFUELING

The Sheldon hand pump is designed for filling fuel tanks on tractors, trucks, etc. The pumping handle is at the nozzle so the operator can see when the tank has been filled.

USE THE "PORTABLE"

SHELDON PUMP

- ★ Pumps 15 gallons a minute
- ★ Primes itself even when dry
- ★ Lifts liquid 15 feet or higher
- ★ Drains quickly
- ★ Controls siphon
- ★ All-metal construction
- ★ Weighs only 7½ pounds
- ★ Strains all fuels
- ★ Furnished with 10 feet of 1" neoprene hose and 3' strainer tube.

For full details write

CUSENBARY SALES CO.

CUNNINGHAM, KANSAS

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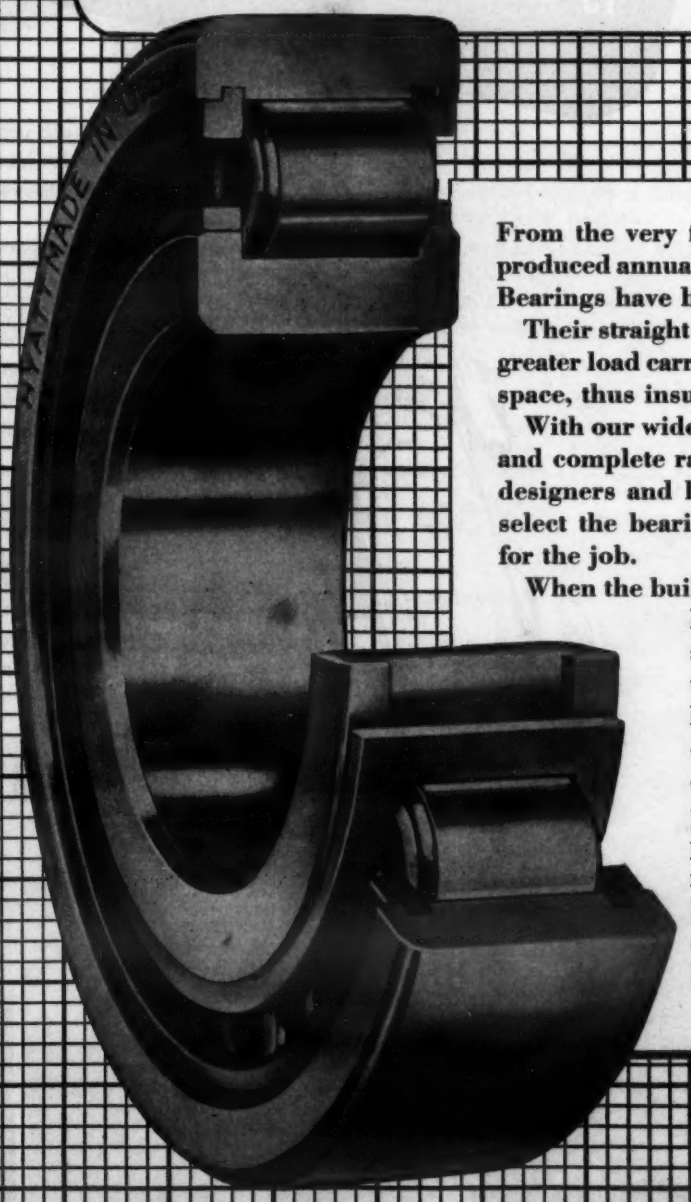


From the very first to the millions now produced annually, Hyatt Hy-Load Roller Bearings have been built to last.

Their straight radial construction offers greater load carrying capacity, in a limited space, thus insuring longer bearing life.

With our wide variety of bearing types, and complete range of sizes we help the designers and builders of machinery to select the bearings most perfectly fitted for the job.

When the builders of equipment select Hyatts, they avail themselves of bearing application "know-how" accumulated by Hyatt engineers during more than half a century devoted to improving the equipment you use with better anti-friction bearings. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS

The capacity of the new Kal-Truk materials handler is ⅔ cubic yard or 3,000 pounds. The unit is powered by a Wisconsin gasoline engine.

Materials Handler Carries 3,000 Pounds

A light-duty self-powered materials handler is available from the Kalamazoo Mfg. Co., Kalamazoo Railway Supply Division, Kalamazoo, Mich. Powered by a 13-hp Wisconsin Model TF gasoline engine, it has a capacity of 3,000 pounds. Its dump body will hold ⅔ cubic yard.

The Kal-Truk has three speeds forward and one in reverse, with a maximum forward speed of 15 mph. Other features include a Rockford single-disk dry-plate tractor clutch 6½ inches in diameter, a Warner Model T-96 selective gear transmission, a Spicer double mechanical universal joint, a full-floating rear axle, and a 15-inch-diameter Ross steering gear.

The Kal-Truk is mounted on a three-wheel chassis. The front wheels are 6:50 x 10, the rear 4 x 4. Turning radius of the body is 76 inches and of the wheels, 61 inches. The unit is equipped with Timken Duo-Grip brakes 2½ inches wide, 8½ inches in diameter, and mounted on the propeller shaft. It measures 85 inches in length, 41 inches in width, and 40 inches to the top of the box; it weighs 1,300 pounds; and it has a 48-inch wheelbase and a front-wheel tread of 40 inches.

Further information may be secured from the company, or by using the Request Card at page 16. Circle No. 87.

Belt-Conveyor Features Listed in 8-Page Catalog

A belt conveyor made in lengths of 25, 30, and 35 feet is described in literature released by the Barber-Greene Co. of Aurora, Ill. The Model 363 can be supplied with either plain or cleated belts, and is recommended by the company for handling sand, stone, gravel, wet concrete, and similar materials.

The 8-page catalog suggests possible applications for the Model 363; drawings show how it can be adapted to many conditions. The center spread of the bulletin is a large photograph of the 363 with a list of its features: high-capacity material handling, head-end drive, no chains or sprockets, stair-channel construction, 25-mph towing speed, and dust-sealed foot end.

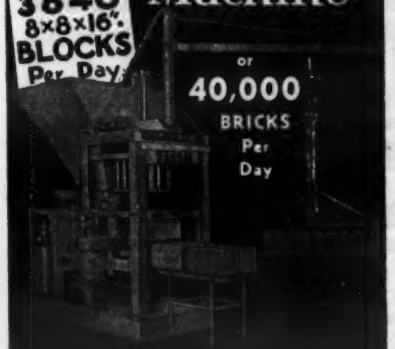
Picture close-ups of the various construction features of the 363 show the full-swiveling wheels, heavy shock absorbers, special B-G belt carriers, optional steel wheels, low clearance, easy-to-operate hoist, and handy towing hitch. Other photographs show the unit with the hopper installed and removed, the features of the plain or cleated belt, the gasoline and the electric power units, the precision drive, belt take-up, and the belt scraper.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 34.

Governor Thomas E. Dewey and New York State Superintendent of Public Works Bertram D. Tallamy, (center), recently became members 1 and 2 of the New York Good Roads Association. Charles H. Sells, Executive Director of the Association, presented them with cards bearing those numbers in ceremonies at the governor's office.

LITH-I-BLOCK Machine

Rated Capacity 3840 8x8x16" BLOCKS Per Day or 40,000 BRICKS Per Day



Tomorrow's block machine is here today, the result of 12 years research by Lith-I-Bar engineers plus over two years of actual production on the pilot model.

It will produce light weight, as well as sand and gravel block. It makes all standard sizes of block, brick and chimney block.

A few of the advantages which have been so widely acclaimed are: unusually quiet operation — continually clean pallets — size changes in as little as 15 minutes — automatic pallet feed — easily adjusted vibrating cycle — instantly adjustable feed timing — off-bearing cycle reduced to one-half of production cycle — simple installation.

Write today for complete details. The Lith-I-Bar Company, Holland, Michigan.

LITH-I-BAR CO.
BOX 64 HOLLAND, MICHIGAN

"Always a Flow of Lubricant" is One Reason for Long Life and Low Maintenance Cost of

EATON

2-Speed Trucks

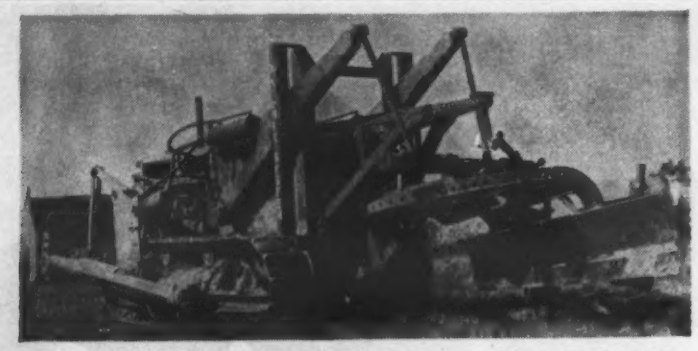
AXLES

Positive lubrication of all vital parts—even at slowest speeds where gear-tooth loads are often highest—is an important factor in the outstanding long-life and low-maintenance cost record of Eaton 2-Speed Axles. In less than one revolution of the bevel gear, oil begins to flow to all moving parts, and the supply is automatically adjusted to meet the demands of operating speed. This abundant lubrication of all gears and bearings reduces friction and wear with consequent longer axle life and lower upkeep cost. Eaton 2-Speed Axles are available for most trucks of the 1½-ton class and larger. See your truck dealer for complete information.

More Than a Million Eaton 2-Speed Axles in Trucks Today

Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

OTHER EATON PRODUCTS



The newest thing for erosion control—a terracing grader designed and developed by soils contractor Alva L. Mix of Boonville, Mo. It's a blade with special mount on the rear of a crawler tractor, with a dozer blade on the front. The unit is also adaptable for ditching and grading, says Mr. Mix.

New Terracing Tool Aids Erosion Control

A new type of tool for use in soil conservation and erosion-control work has been developed by Alva L. Mix, a soils-improvement contractor of Boonville, Mo. Designed especially for terracing and building terrace outlets, it is a grader blade mounted on the rear of a crawler tractor. With this unit on the rear of a tractor and a bulldozer on the front, Mr. Mix says, a contractor is ready to handle any situation which arises in this type of work. Trees can be pushed down, stumps removed, low spots filled, and the terracing done, by using one end of the tractor or the other, as required.

A special box mounting for the grader blade, for which a patent is pending, is the feature of this new piece of equipment. The blade is hinged to the rear of the tractor and is raised or lowered by two hydraulically controlled arms. The arms can be operated one at a time. The angle of the blade, which moves circularly, is set manually. Two shoes attached behind the blade have heavy springs which are compressed as the blade bites into the earth, and aid in achieving a smooth up-and-down motion of the blade. The grader blade can be put on or taken off in a few moments, and other attachments such as a shovel or ripper can be used on the box mount.

Although he developed the unit originally for his own use in soils work, Mr. Mix reports that it is adaptable to ditching, grading, road maintenance, and similar dirt work. And he is making plans for its manufacture in the near future, in order to make it available to other contractors.

Further information may be secured from Mr. Mix. Or use the Request Card at page 16. Circle No. 100.

Rod-Cutting Device

A cutting device for use with reinforcing rods is announced by the Manco Mfg. Co. of Bradley, Ohio. This bolt cutter features a center-cutting action and special chisel-type jaws. The jaws are forged from tool steel specially heat-treated for this type of work.

The Manco cutter's compound leverage is designed to afford a 2-ton cutting force at the jaws with 50 pounds of pressure applied at the handles. It is available in 18, 24, 30, and 36-inch sizes, and in capacities up to 7/16-inch reinforcing rod. The center-cut head assembly has been designed to fit standard bolt cutters now in use and may be obtained separately.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 4.

Powered Material Handler

A materials-handling powered wheelbarrow is described in a 4-page folder issued by Getman Bros., South Haven, Mich. The Scoot-Crete has a 2,000-pound capacity and a 14-cubic-foot volume in its carrying box. A feature of the catalog is a list of accessories for increasing the versatility of the Scoot-Crete: a snow plow, flat-bed platform, scraper blade, platform lift, and a unit for converting it into an industrial truck.

The catalog contains a worm's-eye view of the construction and features of the steering wheel, the double V-belt drive, heavy-duty transmission, truck differential and axle, and the block-tread 7:50 x 10 pneumatic tires. Specifications listed cover the unit's dimensions, power unit, speeds, bearings, and other features. Several photographs show the unit in use on construction jobs, spotting concrete, transporting large concrete buckets and other equipment, and carrying concrete blocks.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 36.

Motorola Splits East Div.

A second region in the New York-New England area has been opened by Motorola, Inc. P. R. Kendall is named Regional Manager for Maine, Massachusetts, New Hampshire, Vermont, and New York, with the exception of metropolitan New York City. Lowell E. White is named Manager of the region covering Rhode Island, Connecticut, New Jersey, and the metropolitan New York City area.

LOW COST FASTER BATCHING WITH
Gar-Bro's Unit Batch Plant

Developed to meet the growing demand for small portable batching plants. Gar-Bro's new Bin Batcher consists of any desired number of hoppers assembled as a unit and equipped with a 3000-lb. capacity weighing batcher to charge a ½ yd. or 16-C mixer. Plant can be moved as a whole from job to job or knocked down and a single unit moved. Each hopper can be used as concrete hopper when not in use as batching plant. Accurate, efficient, built to last!

Each hopper: water level capac., 81 cu. ft.; heaped capac., 100 cu. feet. By adding 3-ft. sideboards capacity can be nearly doubled. Mounted on skids for easy portability on job.

Write direct for full details or contact nearest GAR-BRO distributor.

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Built Better to Last Longer

Don't sell quality short. That's what makes satisfied customers. And that's what you'll find when you rely on the integrity of JACKMANCO methods. Built better . . . Last longer . . . More economy in the long run.

Superior Products Since 1876

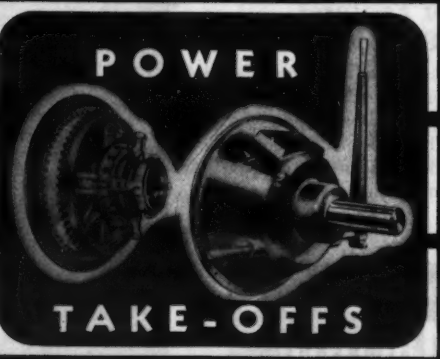
JACKMANCO

MORTAR PAN

MORTAR MIXING BOX

JACKSON MANUFACTURING CO.
HARRISBURG • PENNSYLVANIA

Get More Horsepower Hours—with



ROCKFORD CLUTCHES

Because ROCKFORD CLUTCHES and POWER TAKE-OFFS are custom-engineered to fit each specific application — and because they are precision-made, carefully tested and accurately balanced, they deliver more *horsepower-hours* of reliable operation. Downtime, for adjustments, parts replacements or repairs, is reduced to the absolute minimum. If you are looking for a clutch that will — fit compactly into small space, deliver maximum torque, assure smooth engagement, soak up shock loads — or solve any one of dozens of other clutch problems, it will pay you to get in touch with our clutch engineering department. No obligation.

Learning Your Clutch Needs
Analysing the Problem
Designing the Clutch
Planning Production
Tooling Up
Manufacturing
Checking and Testing
Supervising Installation
Servicing
Automotive and Aircraft
Trucks and Busses
Tractors and Road Machines
Farm Machines and Implements
Oil Field Rigs and Pumps
Industrial
Mowers and Light Machines
Engines and Marine Units
Machine Tools Production Units

BW

ROCKFORD CLUTCH DIVISION
BORG-WARNER

Distributor Doings

Demonstrations Improve Local Roads

Quarter-mile stretches of road were improved in three Massachusetts communities—Framingham, Reading, and Taunton—as the result of demonstrations conducted by the Morrissey Bros. Tractor Co. of Watertown, Mass. Performed at no cost to the local taxpayers, the demonstrations were aimed at proving the versatility of Allis-Chalmers road-building machines.

In each community, a quarter-mile stretch of dirt road was graded and widened, drainage ditches were cleaned, and the road's contours were finished. All work was performed by the Allis-Chalmers Equipment Package, which consists of a Model AD diesel-powered motor grader and a Model HD-5 diesel tractor equipped with a Tracto-Shovel attachment and bulldozer blade. According to the company, these two machines, with the accessories that can be mounted on them, are capable of shaping ditches, cutting and smoothing backslopes, grading, ditching, laying pipe, removing sod, and cutting away embankments.

Lines Added by Florida Dealer

The Llewellyn Machinery Corp. of Miami, Fla., announces its appointment as distributor for the Cleveland Trencher Co., Wayne Motor Sweeper, and the U. S. Tractor Corp. At the same time, the company reports that it has completed the expansion of its office and sales facilities.

Agent for Vacuum Concrete

The Philip Fishman Co., 7 Water St., Boston, Mass., has been appointed New England Representative for Vacuum Concrete, Inc., of Philadelphia. Vacuum concreting is a patented process whereby wet concrete is subjected to a special drying process to form a dense high-early-strength surface.

Dow & Co. Elects John D. Eddy

Dow & Co., Inc., equipment distributor of Buffalo, N. Y., has announced the election of John D. Eddy as Vice President and Sales Manager. Mr. Eddy has been associated with the company for ten years in various sales capacities, and has had fifteen years of previous sales experience in associated lines.

Dow & Co., Inc., sells and services in western New York the products of the following well known manufacturers: J. D. Adams Mfg. Co., Anderson Engineering Co., Barber-Greene Co., Brookville Locomotive Works, Bucyrus-Erie Co., Chain Belt Co., Clyde Iron Works, Electric Tamper & Equipment Co., Erie Steel Construction Co., Frink Sno-Plows, Inc., Gravely Motor Plow & Cultivator Co., W. F. Hebard & Co., The Heil Co., Frank G. Hough Co., Hughes-Keenan Co., Industrial Pallet Co., International Harvester Co., C. R. Jahn Co., Littleford Bros., Inc., Pacific Car & Foundry Co., Quick-Way Truck Shovel Co., Towmotor Corp., Walter Motor Truck Co., and Whiteman Mfg. Co.

Sno-Cat Dealerships Are Available

The Tucker Sno-Cat Corp. announces that it has a few desirable territories still open. The Sno-Cat is a motor-driven vehicle equipped with runners on the front and pontoons with open-link tracks at the rear. It is designed to travel over any kind of snow, and to climb grades as steep as 65 per cent. Dealers interested in handling the Sno-Cat should contact Tucker at Medford, Oreg.

Frantz Headquarters Are Enlarged

The Frantz Tractor Co. has started construction on another addition to its plant at 2740 Ewen St., The Bronx, New York. The addition will cost approximately $100,000. It will add 4,000 square feet of floor space and will provide additional room for offices, parts storage, and showrooms.

Fabick Sells Equipment at Auction

Construction equipment sold at auction attracted more than 800 people to the Fabick Bros. Equipment Co. at Sikeston, Mo., a branch of the John Fabick Tractor Co. of St. Louis. More than $75,000 worth of equipment was auctioned off at the sale, including diesel and gasoline engines, wheel and track-type tractors, draglines, wagons and scrapers, engine-compressor units, rollers, motor graders, cable controls, jackhammers, bulldozers, plows, concrete mixers, and other smaller items.

The auction began at 10:00 a. m. and continued without pause until 4:00 p. m.

A crowd of 800 listened to the chants of auctioneers at the Fabick used-equipment auction recently held in Sikeston, Mo.

Bidding was spirited on almost all the items, as buyers from as far away as Indiana and Texas competed on prices.

(*Continued on next page*)

A Big Advantage In
- Estimating Jobs
- Scheduling Work
- Placing Concrete

Mall VIBRATORS
REG. U.S. PAT. OFF.

On small paving projects or large dam construction, Mall Vibrators give contractors complete control over the placement of concrete from the estimate to the finished job.

A broad range of Gasoline Engine, Electric and Pneumatic Vibrators, with 1500 to 9000 frequencies per minute, provide for placing low-water-cement-ratio concrete on small or large volume pours per hour, with aggregate up to and including 8 inches in size. Furnished with various length of flexible shafting and 1¼" and 2⅜" exclusive, patented vibrating elements that withstand continual, hard impacts.

Ask your Mall Equipment Dealer and write for FREE folder "Mall Concrete Vibrators"

MALL TOOL COMPANY 7743 South Chicago Ave. Chicago 19, Illinois

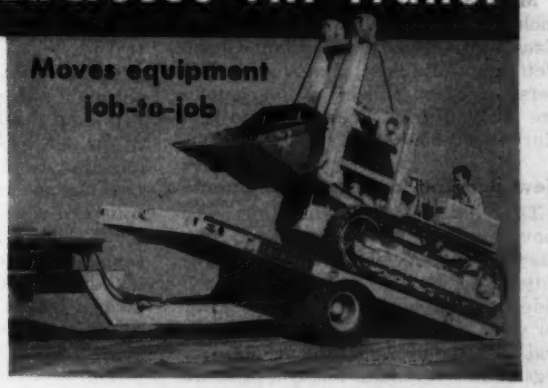
1 Man easily handles all these jobs with LaCrosse Tilt Trailer

Delivers parts, poles, pipe, etc.

Just plug in side stakes (extra) and you're ready to haul all sorts of unwieldy loads, including long pipe, poles, lumber.

Hauls topsoil, gravel, coal, etc.

Simple "home-made" box or rack makes handy carry-all for moving loose bulk materials . . . helps keep trailer busy on "fill-in-jobs."



AUTOMATIC TILTING and leveling, plus simple safety lock on new LaCrosse tilt trailer, makes it easy for one man to load and unload heavy machinery in a hurry, without skids or blocks. 6 to 10-ton load capacity . . . single or tandem axle . . . sure-stop LaCrosse air or vacuum brakes. Ideal for contractors, counties, cities, etc. . . . also profitable for "one-man business" or side-line. Low in cost . . . easily hauled by any 1-ton truck with pintle hook . . . backed by 16 years of LaCrosse engineering leadership. Write for details. LC-7

Check Today!

LA CROSSE TRAILER CORPORATION, La Crosse, Wis.

☐ Rush complete information on LaCrosse Tilt Trailers
☐ Specifications ☐ Prices ☐ Delivery
☐ Send name of nearest LaCrosse Trailer Distributor
☐ Send facts on standard LaCrosse low beds (up to 67 tons cap.)

Name.....Title.....
Employed by.....
Address.....
City.....State.....

LACROSSE
Low-Cost TRAILER TRANSPORTATION

Distributor Doings

(*Continued from preceding page*)

Joe Griffin, Manager of the Fabick branch at Sikeston, was in charge of the auction. Auctioneers were Beck & McCord.

The branch at Sikeston is one of four John Fabick Tractor Co. branches. Other Fabick sales and service centers are at St. Louis, Mo.; Salem, Ill.; and Marion, Ill.

Two New Hydro-Line Distributors

Hydro-Line Mfg. Co. of Rockford, Ill., has appointed two new exclusive representatives for its line of air and hydraulic cylinders and special machinery. The Leaser Engineering Co. of La Porte, Ind., will cover northern Indiana and the south side of Chicago. Euclid Machine & Sales Co., 1836 Euclid Ave., Cleveland, Ohio, will cover all of northern Ohio.

Allied Expands Its Miami Office

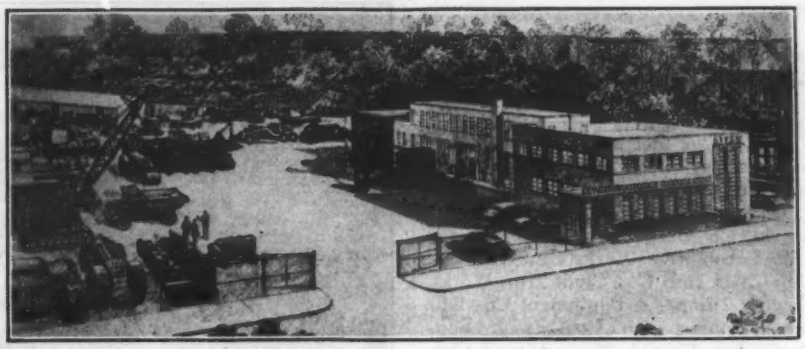
An addition which doubles the company's floor space has been completed by Allied Equipment, Inc., 7511 N. W. 7th Ave., Miami, Fla. The original building is used for a display room and offices, and the new building for a parts department and shops.

Manufacturers represented by Allied include Worthington-Ransome, General Excavator, Osgood Co., LaPlant-Choate, Pettibone Mulliken, Haiss, and Universal Crusher. Officers of the company are P. W. Burke, President, and C. J. Korb, Secretary and Treasurer.

New Building for Atlas Equipment

The Atlas Equipment Corp. has moved into a newly completed two-story addition located at 635 Ridge Ave., Pittsburgh, Pa. The new addition provides executive offices; larger quarters for sales, accounting, and clerical staffs; and an assembly room for group meetings and conferences. The company was founded in 1935 and moved to its present site in 1945.

Machines handled by Atlas include Thew-Lorain shovels, cranes, draglines, and Moto-Cranes; International Harvester tractors and power units; Euclid hauling equipment and loaders; Worthington compressors and air tools; Buffalo-Springfield rollers; Buda material-handling equipment; Adams graders and scrapers; Page walkers and draglines; Iowa clamshell buckets and scrap and pulpwood grapples; Bucyrus-Erie scrapers and tractor attachments; Hughes-Keenan Roustabout power tractors; Hebard tractors and tow trucks; Cleveland trenchers; Eagle washers, classifiers, and dehydrators; Mixermobiles, Wagnermobiles, and Scoopmobiles; C. H. & E. pumps, hoists, and saw rigs; Heil scrapers and tractor attachments; Roger trailers; Hough tractor attachments; and Ready-Power engine generators and magnet chargers.



The officers and clerical personnel of Atlas Equipment Corp. are now occupying a new two-story building recently completed to enlarge the company's headquarters at 635 Ridge Ave., Pittsburgh.

Handles Bucyrus-Erie in Florida

Gibbs Corp., of Jacksonville, Fla., has been appointed a distributor for Bucyrus-Erie excavators and the new all-hydraulic truck-mounted Hydrocrane throughout the north-central Florida territory.

On the west, Gibbs' territory extends through the counties of Gadsen, Liberty, and Franklin. The southern limits of its shovel-crane-dragline territory include Hernando, Sumpter, Lake, Osceola, and Indian River Counties; the southern edge of its Hydrocrane territory includes Levy, Marion, Lake, Osceola, and Brevard Counties. The remaining boundaries of its territory are formed by the Florida state line. Gibbs maintains branches at Tallahassee and Maitland.

Southern Florida contractors will, as before, be served by Llewellyn Machinery Corp. of Miami, and Epperson & Co. of Tampa.

Oklahoma City Dealer Expands

The Boardman Co. of Oklahoma City, Okla., has announced the establishment of a new branch at 3415 Sand Springs Road, Tulsa, Okla. Complete sales and service facilities, including parts stocks, are available.

James Pulliam is in charge of the new Tulsa branch, assisted by Harold Rodgers, Manager of Parts and Service. Boardman Co. also announces the appointment of I. L. Mynatt as Sales Manager in charge of road-building and construction-machinery sales. Mr. Mynatt was formerly associated with the Wentz Equipment Co. of Salina, Kans.

The equipment handled by Boardman includes Allis-Chalmers diesel crawler tractors, motor graders, and power units; Buckeye ladder and wheel-type ditchers, power shovels and cranes, material spreaders, highway wideners, and Finegraders; Gar Wood two and four-wheel scrapers, and bulldozers; Baker bulldozers; Novo pumps and engines; and Wheeler tandem rollers.

Directors of Dravo-Doyle Elected

Alfred S. Osbourne and Louis A. Mertz have been elected Directors of the Dravo-Doyle Co. The firm sells and rents new and used construction equipment in the Pittsburgh area.

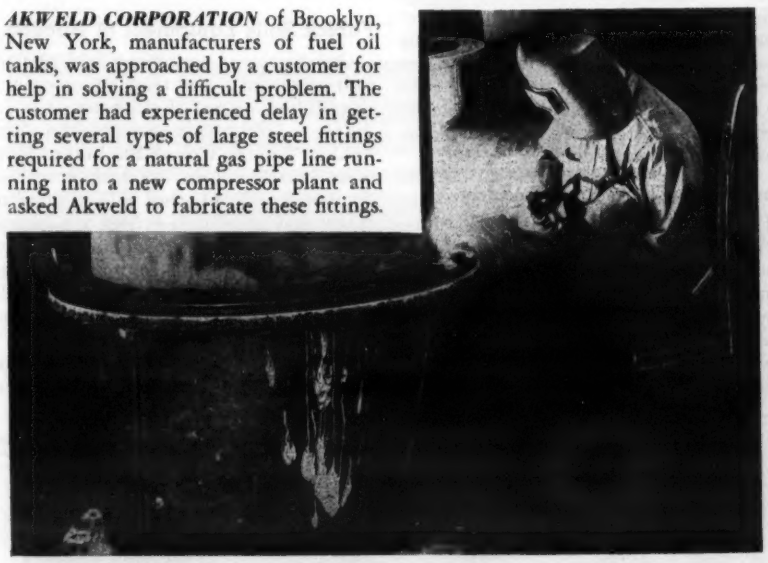
Ed Reed Joins Central Machinery Co.

R. E. (Ed) Reed has joined the Central Machinery Co., Caterpillar distributor at Great Falls and Havre, Mont., as Assistant Manager. He was

(*Concluded on next page*)

Gas cutting & arc welding solves another fabrication problem

AKWELD CORPORATION of Brooklyn, New York, manufacturers of fuel oil tanks, was approached by a customer for help in solving a difficult problem. The customer had experienced delay in getting several types of large steel fittings required for a natural gas pipe line running into a new compressor plant and asked Akweld to fabricate these fittings.



Jack Saunders, Airco Technical Sales Representative, assisted Akweld in making up the required fittings from steel plate. The sections were first cut from ¼" and 5/16" thick stock, with an Airco Number 10 Radiagraph gas cutting machine; then rolled into shape and fabricated with Airco Number 90 electrodes.

In all, 50 fittings were made, ranging in diameter from 8 inches to 50 inches. The photograph above shows one of the larger fittings being welded. Note how the flange is backed up to control distortion. As a result of their success with this job Akweld received an order to fabricate more of those special steel fittings from another concern.

. . . .

TECHNICAL SALES SERVICE — ANOTHER AIRCO PLUS-VALUE FOR CUSTOMERS

To assure its customers of high efficiency in all applications of the oxyacetylene flame or electric arc, Air Reduction has available the broad, practical experience of its nationwide Technical Sales Division personnel. The collective experience and knowledge of these specialists has helped thousands to a more effective use of Airco processes and products. Ask about this Airco "Plus-Value" service today. Write your nearest Airco office. (In Texas: Magnolia Airco Gas Products Company . . . On West Coast: Air Reduction Pacific Company.)

AIRCO AIR REDUCTION

Offices in Principal Cities

Headquarters for Oxygen, Acetylene and Other Gases . . . Carbide . . . Gas Cutting Machines . . . Gas Welding Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories

Operators Say:

OMAHA DRAGLINE BUCKETS

Tops 'em all!

In Profit and Payload

"I like a dragline bucket that fills easily in two to three bucket lengths without time-wasting and strenuous jockeying for a new position. That's why I like Omaha Dragline Buckets, because at the end of the day my quota is filled, and I'm not tired out."

Write for complete catalog

It's Omaha Dragline Buckets for Tops in Job Performance. In all kinds of digging there's a full load with every cast with an extra payload built-in by the elimination of surplus weight. On the job and on the job record, Omaha Buckets pay off with a profit.

DRAKE-WILLIAMS-MOUNT • OMAHA, NEBR.

Distributor Doings

(*Continued from preceding page*)

formerly associated with the Davenport, Wash., branch of the E & C Equipment Co. Mr. Reed will replace Jerry Lane. Henry Sheffels is President of Central, and Fred Lively is Vice President and General Manager.

Dealers Wanted for Warsop Tools

Dealers interested in handling Warsop rock drills and pavement breakers are asked to contact Warsop Power Tools, Inc., 347 N. 12th St., Philadelphia 7, Pa. The Warsop breaker is said to strike 2,200 blows per minute. It can be used with all types of attachments. The drill is similar to the breaker but incorporates a mechanism for automatic rotation of the drill steel.

McLean Opens New Headquarters

The McLean Co., Cleveland, Ohio, for 20 years exclusive distributor for the Barber-Greene Co., held an open house April 29 in its new office, service headquarters, and warehouse building at 3525 Lakeside Ave. Besides a lobby and office space, the 40 x 120-foot fireproof masonry building has a modern machine shop for the maintenance, repair, and rebuilding of heavy machinery. A private depressed railroad siding which serves the property simplifies loading and unloading of heavy equipment. A loading dock provides facilities for handling truck and trailer shipments.

Holding exclusive contract for the sale of B-G's Construction Division products, The McLean Co. serves all of Ohio except the thirteen counties around Cincinnati. The firm also holds an exclusive contract for the sale of B-G's Industrial Division products in all of the central and northern counties of Ohio. Don and Ken McLean are the two principals of the partnership.

Represents Barnes in Indiana, Ohio

The Cincinnati Industrial Sales Co., 2832 Stanton Ave., Cincinnati, Ohio, now represents the John S. Barnes Corp. in Ohio, south of and including Dayton; and in Indiana, south of and including Indianapolis. Barnes makes hydraulic structures, controls, and fluid power units. R. F. Williams heads the Cincinnati Industrial Sales Co.

National Agent for Little Giant

Paul M. Cole Co., Chicago, Ill., has been appointed national and international distributor for the Little Giant line of cranes and shovels. This equipment is manufactured by the Des Moines Dragline Service. Other lines handled by Cole include the Backlin Stratedge asphalt and concrete cutter, and the Century Spread-All hydraulic spreader.

Good Roads Association Is Inaugurated in Peru

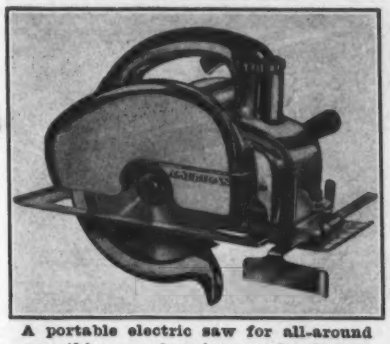
The International Road Federation announces the inauguration of its affiliate, the Peruvian Road Association, in Lima on March 31. Eduardo Dibos, Vice President of the Goodyear Tire & Rubber Co. in Peru and President of the Touring & Automobile Club of Peru, was elected President of the newly formed organization.

The International Road Federation was formed last year by the North American petroleum, rubber, and automotive industries for the improvement and extension of roads in all countries of the world. The new Peruvian affiliate will work in close cooperation with the International and with other Latin American road federations for the promotion of adequate roads there. It will place special emphasis on feeder and farm-to-market connections.

Electric Hand Saw

An electric saw that is balanced for one-hand operation is announced by the American Floor Surfacing Machine Co., 539 S. St. Clair St., Toledo, Ohio. It has an 8½-inch blade and will cut a 2⅛-inch plank at 45 degrees, or will make a straight cut of 3 inches, the manufacturer says. The American saw is powered by a 2⅛-hp General Electric motor. The tool employs a balanced torque principle in which the motor and saw blade turn in opposite directions to keep the saw from jolting or twisting when it starts.

Extra strength and stability are said to be provided by an extra-wide base of hard aluminum alloy. Both sides of the base are machined parallel with the blade, and either can be used against a guide strip in ripping. Depth is adjusted without tilting the handle or changing the balance of the machine. The front of the base plate is calibrated in inches so that many kinds of guide lines may be used, either to the right or left of the blade. The saw may be set for cutting angles from 0 to 50 degrees.



A portable electric saw for all-around use, this new American model has an 8½-inch blade and special G-E motor.

Other features include a telescoping blade guard, lifetime-lubricated SKF Red Seal bearings, and a totally enclosed trigger-type safety switch on the handle. The saw weighs 19½ pounds. Standard equipment includes a metal carrying case, a wrench for removing saw blades, and a combination rip and cross-cut blade. Also available are cross-cut, rip, abrasive cut-off, and diamond wheel.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 2.

"EUCS" MAKE THE DIRT FLY AT ATLANTA AIRPORT!

YES, SIR! MacDougald Construction Company depends on Euclid equipment to keep Atlanta's Candler Field extension project ahead of schedule. The contract specifies that the job be completed in 240 working days.

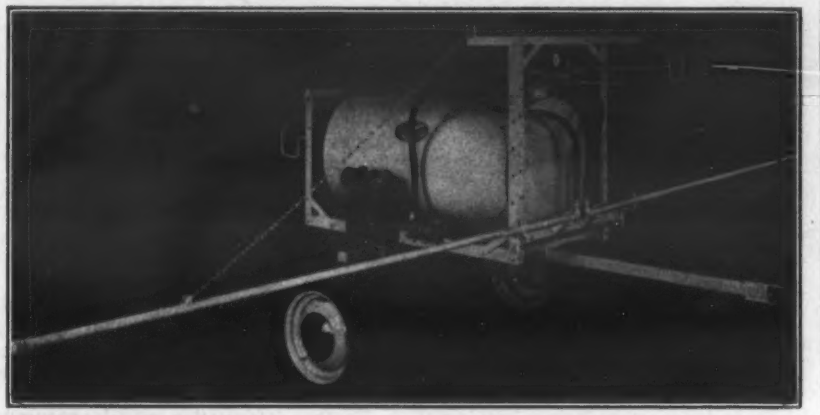
Twenty-three Bottom-Dump Euclids working with two Euclid Loaders and six Rear-Dump Euclids loaded by 3 cu. yd. draglines are moving all of the 2,300,000 cubic yards of excavation on this project. Average hourly production of each Loader is 800 bank yards, with between 15,000 and 18,000 cubic yards overall being moved in an eight-hour day. The average haul from cut to fill is approximately 1,800 feet.

Widely used for heavy construction and mining work, Euclids provide extra power and capacity . . . fast travel speeds . . . quick, clean dumping . . . low maintenance costs . . . and efficient, long-life performance.

"Eucs" are built for dependable service that cuts your hauling costs. For information on the complete Euclid line or help with your equipment problems, see your Euclid distributor or factory branch.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

EUCLIDS



Kromer's standard 6-20T power sprayer for weed-killing has a 125-gallon tank. Booms may be mounted front or rear, with a safety locking feature in each location.

High-Speed Sprayers

Power sprayers for all types of weed-killing operations are manufactured by the O. W. Kromer Co., 1120 Emerson Ave., N., Minneapolis 11, Minn. The Kromer line includes four tractor-mounted units, six trailer-mounted units, and a special hand-spray attachment for use in inaccessible areas or in close quarters.

Features claimed for the Kromer line include nozzles which deliver a flat fan-type shower of small droplets to minimize fogging and make it possible to spray in windy weather; a special chemical-resistant coating on the inside of the parts; a steady even flow at all nozzles; and an adjustable regulator which maintains pressures at a set reading. The unit can be driven by a power take-off, or—if a power take-off is not available—it can be rigged to a belt-pulley drive.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 82.

Pillow-Block Series

Pillow blocks in a new series are announced by The Fafnir Bearing Co., New Britain, Conn. They feature Mechani-Seal ball bearings, one-piece housing, self-alignment, and pre-lubrication. Designated the LAO Series, the blocks are produced in nine shaft sizes ranging from 1 3/16 to 2 15/16 inches.

Each LAO incorporates a heavy-series ball bearing with a wide inner ring and self-locking collar. These bearings are said to make installation on the shaft simple, and removal easy. The Mechani-Seal is described as a labyrinth type of closure plus an external slinger member designed to throw off contaminants when operating at normal speed. A washer of synthetic rubber and felt has been incorporated for added protection at low speeds or under adverse atmospheric conditions, the manufacturer states.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 7.

Protective Coatings

Protective-coating materials and related compounds are produced by The Wilbur & Williams Co., Greenleaf and Leon Sts., Boston 15, Mass. These include Rust-O-Primer, Rubber-Coat, and Totrust enamel and primer surfacer. The Rust-O-Primer is described as a vinyl-base quick-drying chemical pre-treatment and primer for metals. Designed to eliminate the necessity for removing rust, it can be applied over rusted areas without any special treatment prior to painting.

The W&W Rubber-Coat porous-masonry paint is designed to fill, seal, prime, and finish all types of porous masonry. It has a cream-like consistency and is applied by brush. It is highly resistant to the passage of moisture, says the manufacturer; supplies a finish for interior work; and replaces grout on exterior work.

The Totrust enamel and primer surfacer are especially recommended by the company for use on heavy-duty construction equipment. The enamel is supplied in colors to match the original color of construction equipment, and the surfacer is said to combine the advantages of a filler with rust-preventive qualities.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 106.

Fork Arms for Tractors

Fork arms for attaching to bulldozers are described in a 4-page folder prepared by the Dozer Blade Fork Co., Box 1605, Parkersburg, W. Va. They are designed to increase the usefulness of the bulldozers and to convert them into carrying or hauling units. They extend 31 inches in front of the blade, and are adjustable to fit blades from 22 to 48 inches in height.

The folder describes the various uses for which these arms can be adapted and tells how they are attached to the blade. Photographs show the arms loading steel I-beams and moving concrete pipe. Drawings show how the two kinds of top sections fit the arms to various makes of blades, how the positive lock prevents slipping, how the arms are adjustable, and how reinforcing is built into them.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 122.

New Luminous Suit For Night Workers

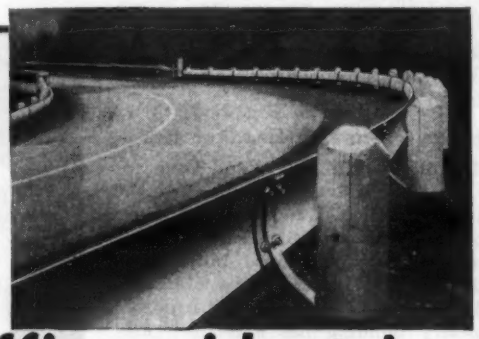
A safety suit designed to make nighttime workers clearly visible at 400 feet in the dark has been brought out by Interstate Mfg. Co., Hudson, Mass. It is distributed nationally by Hatheway & Patterson Co., Inc., 100 South Bay Ave., Boston 18, Mass. Scotchlite marking tape gives the suit its luminous quality and protection against night accidents.

The Interstate suit is made of lightweight, double-textured, waterproof fabric. It comes in several two-piece styles as well as in raincoat and cape styles.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 108.

Exceeds all state safety specifications

TUTHILL HYWAY GUARD



cuts traffic accidents!

Write for technical brochure today!

Super-strong Hyway Guards safely deflect cars and cushion shock to vehicle, occupants and rail. Easily seen by day or night. Speedy, permanent erection with little or no maintenance required.

TUTHILL SPRING CO.
760 W. Polk Street, Chicago 7, Illinois

ROAD CONTRACTORS AGREE

CONCRETE CURES
✓ BETTER
✓ QUICKER
✓ CHEAPER
with Fulco COTTON Concrete-Curing MATS

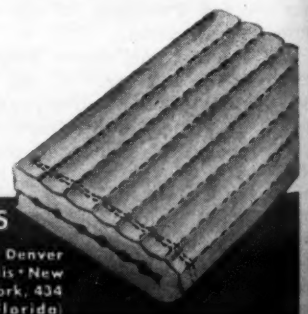
BETTER—Because the compressive strength of concrete cured by Fulco Mats is greater than that cured by any other method. Concrete cures uniformly, reduces the possibility of cracks to absolute minimum.

QUICKER — The constant dampness necessary to curing concrete can be maintained easier, with less water, and concrete cures in 72 hours. Fulco Mats insulate against temperature changes, too.

CHEAPER—Fulco Mats require less water. They are easier to keep wet, and because they can be used on job after job, their per job cost is reduced to an insignificant amount.

Fulco Cotton Concrete Curing Mats are favored and approved for state and Federal highway construction.
FULCO Mats are made 5½'x22' in size, durably covered with tough cotton fabric, filled with padding weighing 12 oz. per sq. yd.

Every contractor needs Fulton Triple-Strength Tarps of 1,000 uses, for protecting machinery and supplies from the inroads of the weather. WRITE FOR PRICE LIST. ADDRESS NEAREST FACTORY BRANCH



BAG & COTTON MILLS
Fulton
Atlanta • St. Louis • Dallas • Denver
Kansas City (Kans.) • Minneapolis • New Orleans • Los Angeles • New York, 434 Broadway • Winter Haven (Florida)

DAREX AEA

For high quality air-entrained concrete —backed by a competent engineering field service readily available from your distributor.

DEWEY AND ALMY CHEMICAL COMPANY
CAMBRIDGE 40, MASS.

The new Markroy bucket-type elevator will unload material from hopper cars to truck or stockpile at the rate of 1½ to 2 tons per minute.

Bucket-Type Elevator For Car Unloading

A bucket-type elevator designed especially for car-unloading operations is announced by the Markroy Co., Dept. CG-1, 6th and McCambridge, Madison, Ill. It can be used to transfer materials such as gravel, stone, aglime, sand, cement, and aggregate at rates of from 1½ to 2 tons per minute, the manufacturer states. The unit is designed to operate without disturbing the rail bed in any way, and without requiring a concrete pit under the tracks.

Features claimed for the Markroy unloader include one-man operation, ease of cleaning and installation, positive feed control, adjustable length, and tube-frame construction. The machine is powered by either a Wisconsin gasoline engine rated at 6.8 to 9.2 hp, or by an electric motor. The buckets measure 7 x 12 inches and have a capacity of 0.19 cubic feet.

Discharge height is 9 feet; distance from car to outside of truck is 15 feet 6 inches; and distance from tires on the unloader to center line of the discharge chute is 4 feet. The elevator has an overall height of 13 feet 6 inches, a feeder length of 9 feet 5 inches, feeder openings of 8 x 10 inches, a travel height of 6 feet, and a travel width of 64 inches. The elevator, complete with buckets, weighs 2,650 pounds; the feeder, 750 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 29.

Catalog on Rock Crushers

Rock crushers in several sizes and styles are described in an 8-page catalog available from the American Good Roads Machinery Co., Water St. at Highway 30, Bryn Mawr, Pa. These include the Champion roller-bearing crushers, Champion primary crushers, the No. 5-X Champion crusher, and the Climax primary crushers.

Each of these crushers is described in detail and illustrated. General data and dimensions provided for each model cover jaw opening, capacity in tons per hour, flywheels, overall height, height to mouth, overall length, cam-shaft length, approximate horsepower requirements, thickness of plates, and others.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 31.

Lightweight Utility Lute

A light-duty lute for use in paving operations is described in a bulletin available from Hy-Way Machinery, Inc., 3697 Oakwood Ave., Youngstown 9, Ohio. It is recommended by the company for spreading, leveling, and contour-shaping of asphaltic concrete, road aggregate, concrete, or topsoil.

The bulletin contains information on the blade, which is 30 inches long and 3 inches wide; on the wooden handle, which is 66 inches long; and on other features of the lute. It pictures the tool in use and points out that by reversing the blade, it can be used as an efficient light-duty scraper. The bulletin lists the weight of the lute with a stainless-steel blade at 4½ pounds; with an aluminum blade, at 4 pounds.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 119.

BACK-RIP SCARIFIER

RIPS in your dead-head time when backing for new load.

BACK-RIPPING Saves Contractors TIME, MONEY and EQUIPMENT.

Hinged teeth assemblies mount on back of Bulldozer moldboards.

SWINGS FREE WHEN DOZING

SMALL EQUIPMENT COMPANY
916 North La Cienega Blvd.
LOS ANGELES 46, CALIFORNIA

LIGHTER . . . EASIER TO HANDLE . . .

you place concrete *FASTER* with a

MAGINNISS

HI-LECTRIC CONCRETE VIBRATOR

WHY? Because there's no flexible shaft! No engine to move! The Generator is set off the job, out of the way. Only a lightweight cable runs to the vibrator. One man operates it, the On-Off switch is at his fingertip. 9,500 VPM with no power loss insures faster and more uniform concrete placement.

SAFE? Sure, because generator and motors are wound for 110 volt, 180 cycle operation, and are grounded.

—EXTRA FEATURES—

The Hi-lectric Generator operates 2 vibrators, as well as standard floodlights and Hi-lectric Saws and Grinders. Versatility, light weight, low operating and maintenance cost are just a few of the many advantages of Hi-lectric equipment.

Maginniss POWER TOOL CO.

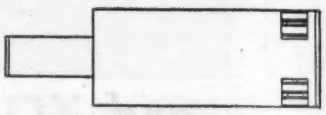
129 DISTL AVE., MANSFIELD, OHIO

GREATER EFFICIENCY AND ECONOMY THE DORSEY

Select the DORSEY Low Bed Machinery Trailer with Confidence!

Model M 15-20-25 Tons

Model MT 35-40-50-60-75 Tons



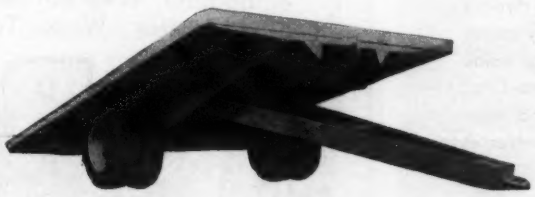
Model MK 10-15 Tons

Contractors and Engineers throughout the nation are selecting the Dorsey Low Bed Heavy Duty Semi or Full Trailers to move heavy equipment . . . to "Make the Heavy Jobs Light."

Dorsey Low Beds are available in four models — M — MK — MTS and MT — with capacities from 10 T to 75 T — a model for every need and state law load limit.

"Engineered for minimum weight . . . safe road performance . . . new low platform height . . . new hydraulic, air or vacuum brakes, all are features of advanced design that insure *low, dependable, operating economy.*"

DORSEY TILT-TO-LOAD TRAILERS



Model MTS

15-20-25-30-35 Tons

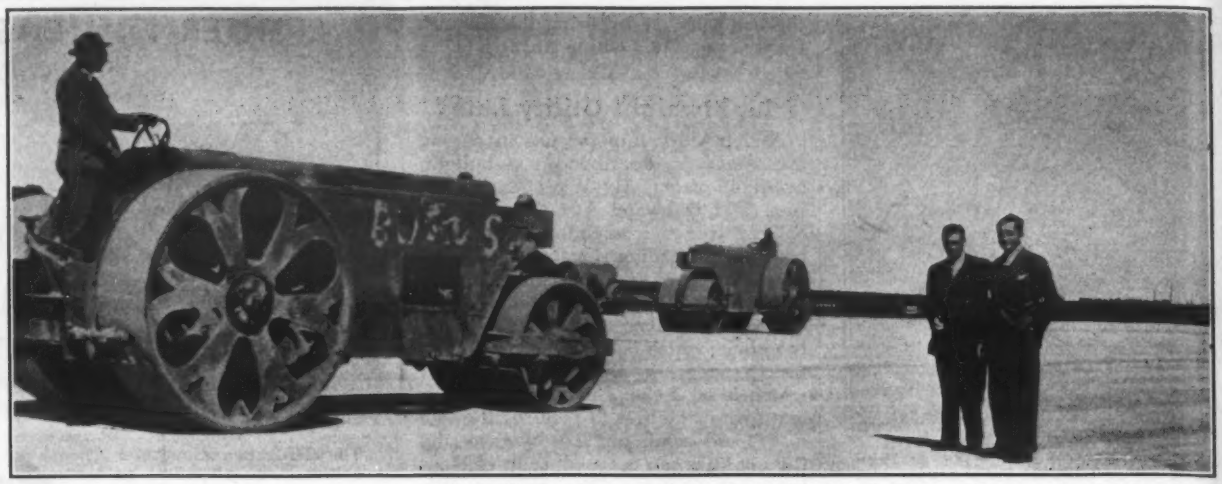
A-7 7,500 lb. A-15 15,000 lb. A-20 20,000 lb.

DORSEY TRAILERS
ELBA ALABAMA, U. S. A.

Giant Airport Built Near Buenos Aires

Heavy construction equipment is speeding completion of the General Pistarini Airport at Ezeiza near Buenos Aires, Argentina. Three of the runways have been completed and are in use. These are No. 1 and No. 2 runways, each 5,576 feet long and approximately 230 feet wide, and the No. 3 runway, which is 6,888 feet long and 260 feet wide. The thickness of the bituminous-concrete base for the runways is 4.3 feet.

Included in the list of equipment used on the job are twelve Huber 10-ton 3-wheel rollers. They have worked on the vast project since its inception, also helping to build a 20-mile 2-lane access highway from the Buenos Aires city limits to the airport site. When completed, General Pistarini Airport will be one of the world's largest, most modern, and radically different flying fields. Advanced engineering planning has provided it with a unique and highly efficient system for its twelve giant runways.



Huber rollers at work on the General Pistarini Airport near Buenos Aires. Three of the 12 runways are completed and in use. Huber Export Manager Willis Nye, left, and Roberto Dobranich of Dobranich & Cia, Huber distributor in Buenos Aires, look on.

Catalogs on Plate Feeders, Pulverizers, and Idlers

Three new bulletins have been issued by the Lippmann Engineering Works, 4603 W. Mitchell St., Milwaukee 14, Wis. Bulletin No. 1160 describes the Lippmann line of pulverizers; Bulletin No. 1410, the Lippmann troughing and return idlers; and Bulletin No. 1140, reciprocating plate feeders.

The 12-page two-color pulverizer bulletin, called "Greater Quantities at Lower Costs", contains capacity tables, a list of dimensions, and complete specifications for the 15 sizes in which these pulverizers are available. It describes in detail their upswing action, their flexibility, the hammer and breaker plate design, and the non-choking crushing chamber.

Bulletin 1410 discusses applications of the idlers and shows by cut-away views the construction features of both the ball-bearing and tapered-roller-bearing units. These features include permanent lubrication, elimination of catwalks, no periodic adjustment for wear, low first cost, light weight, and others. Dimension drawings and tables are provided for eleven belt widths from 14 to 60 inches and for 3½, 4, 5, and 6-inch roller diameters for nine types of idlers.

Bulletin 1440 points out the anti-friction-bearing feature of the Lippmann reciprocating plate feeders, said to provide them with true-running and long-life efficiency; their positive feed control by means of an adjustable eccentric; and their heavy-plate construction.

This literature may be obtained from the company, or by using the Request Card at page 16. For Bulletin 1160, circle No. 112; for Bulletin 1410, circle No. 113; and for Bulletin 1440, circle No. 125.

Air Cranking Motor

Air cranking motors for starting heavy diesel and gasoline engines are manufactured by the Leece-Neville Co., 5109 Hamilton Ave., Cleveland, Ohio. According to the manufacturer, these compressed-air-driven motors are easily installed and occupy approximately the same space as electric starters.

The Leece-Neville motors can be used singly or in pairs. Under normal conditions, one unit can start engines of up to 1,000-cubic-inch displacement, the company says. The air crankers weigh 43 pounds each.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 115.

Electric-Tool Service

The Indianapolis service station of the Black & Decker Mfg. Co., Towson, Md., has moved to a new building located at 1125 W. 16th St. There the portable electric tools made by the company will be serviced by factory-trained personnel, and an increased stock of replacement parts will be available. Service Engineer J. T. Redmon and Sales Engineer M. D. Mooers are in charge.

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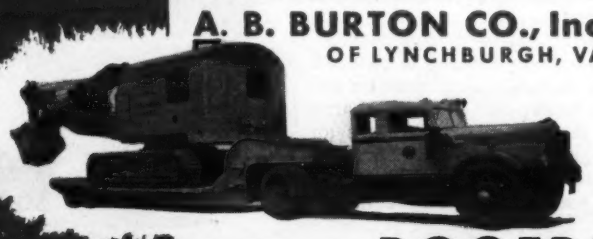

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Precast Concrete Speeds Building Work

Eight Dormitories Erected With Walls and Partitions Of Precast Slabs; Floors Are Poured in Place

By WILLIAM H. QUIRK,
Eastern Editor

✦ EIGHT modern dormitories, accommodating 1,253 students, have recently been built at the University of Connecticut to relieve the severe housing shortage. These new, permanent structures at Storrs, Conn., were erected within the short time of ten months—the first foundation was dug in March, 1948, and the final finishing touches were completed by the end of the year. This remarkable progress was due primarily to the design of the eight buildings which featured the use of some 7,000 precast concrete slabs. The precast dormitories were designed by McKim, Mead & White, New York City architects. Fred N. Severud was the consulting structural engineer.

While the use of precast concrete panels is, of course, not new, the particular technique of casting and placing them, and the structural use of such panels, is a new development and constitutes an important contribution to the construction industry. The development arose from the need of educational institutions throughout the country to provide additional student housing quickly and at low cost. These two particular requirements, speed and economy, seemed almost impossible to meet in the face of rising building prices and material costs, together with labor shortages. But intensive studies were undertaken by the architects, and a complete re-examination was made of accepted types of construction and accepted standards of accommodations for college dormitories. From these studies new standards were established, and a new construction technique based on prefabricated concrete panels was developed.

The first practical application of this new system of precast construction was in the erection of four dormitory buildings at the University of Vermont in 1947. These provided permanent and fully fireproof accommodation for 567 students, at a construction cost, including grading, roads, walks, and furniture, of $762,000, or $1,344 per student. This cost was identical with that established by the University program, and less than half that of buildings erected under conventional construction techniques and standards. These units consist of three men's dormitories, each four stories high and housing 142 students, with lounge rooms and administrative facilities on the first floor; and one women's dormitory housing 143 students in three stories.

So successful was this first group that the University of Connecticut adopted the new system as standard. The dormitories at the two universities are similar, built from the same basic design, but different contractors were employed on each project. The eight buildings at Storrs, Conn., were constructed under a $1,730,000 contract awarded by the Connecticut State Comptroller in January, 1948. Additional construction, under another contract, is now under way in this group to increase the accommodations from 1,253 to 1,560 students, and provide kitchen and dining facilities for the entire group.

State and University authorities have been so pleased with these buildings that construction will start in the near future on two additional groups for men and women, each housing 1,140 students. Each unit is provided with kitchen and dining facilities. The men's group is scheduled for partial occupancy in September, 1949, and final completion in February, 1950. The women's group is to be completed in July, 1950.

Speedy Construction, Low Cost

Since the war, enrollment at the University of Connecticut, a land-grant coeducational college, has been increasing steadily. It has taxed not only the regular dormitory accommodations, but also the temporary makeshift quarters that are now dotting so many of the nation's college campuses. Consequently the speedy construction of this new project has eased the housing headache of the University officials, while the use

McKim, Mead & White Photo
Here are four of the eight dormitories recently built at the University of Connecticut to relieve the severe student housing shortage. McKim, Mead & White, New York City architects, were responsible for the special design featuring precast concrete slabs.

of the precast-slab technique has resulted in a considerable saving to the State.

Naturally the amount of reduction in cost has not been proved by actual bids, since this would involve two complete designs as well as two complete sets of drawings and specifications. These dormitories, however, have been built at a cubic-foot cost lower than in any other building contracts which the State has let in several years. Some of this reduction in cost is due to a

(*Continued on next page*)

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Precast Concrete Speeds Building Work

(*Continued from preceding page*)

scaling down of requirements (e.g., ratio of toilet fixtures) as well as to the type of construction. The conventional type of construction would also have taken at least 1½ years to complete. Four of the Connecticut buildings were actually ready for the beginning of the 1948 fall term. Students were occupying these dormitories on September 8, just slightly over four months from the time the first floor slab was laid on April 27.

McKim, Mead & White and C. & E. M. Photos

The first eight dormitories were built in two groups of four each, with the buildings in each group joined together in step construction, both horizontally and vertically, up the side of a hill. By following the contour of the ground in laying out the buildings, the designers kept the foundation excavation to a minimum and made it unnecessary to take a deep cut into the hillside. The top of the hill is 38 feet higher than the bottom. The two groups of four buildings face each other across a grassy landscaped campus criss-crossed with connecting walks.

Four Stories and Basement

Buildings 1, 3, 5, and 7, laid out from south to north along the west side of the hill, were the first four-dormitory group to be built. Each building measures 138 feet long on the north-south axis x 36 feet 6 inches wide from east to west, and contains four stories and a basement. Student bedrooms occupy the west side of the basements in units 1, 3, 5, and 7, where the basement floor is entirely out of the ground. There are no student rooms in the basements of units 2, 4, 6, and 8, where the floor is below ground level.

In the west group, building 1 is at the bottom of the hill; building 3 at its

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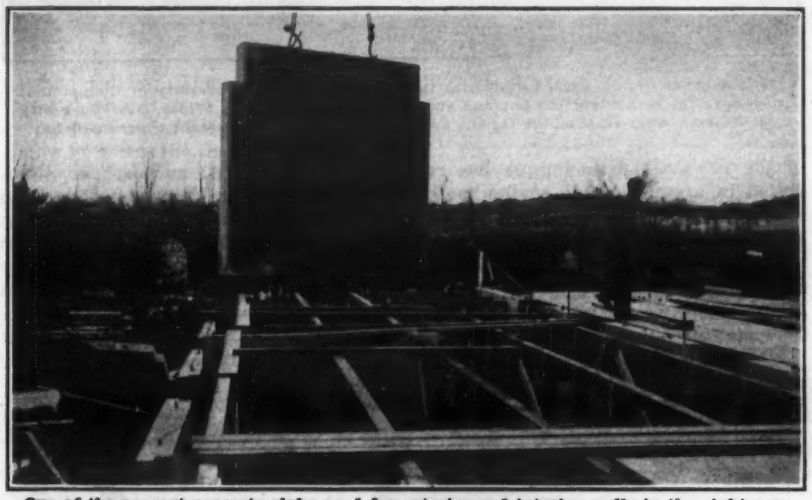
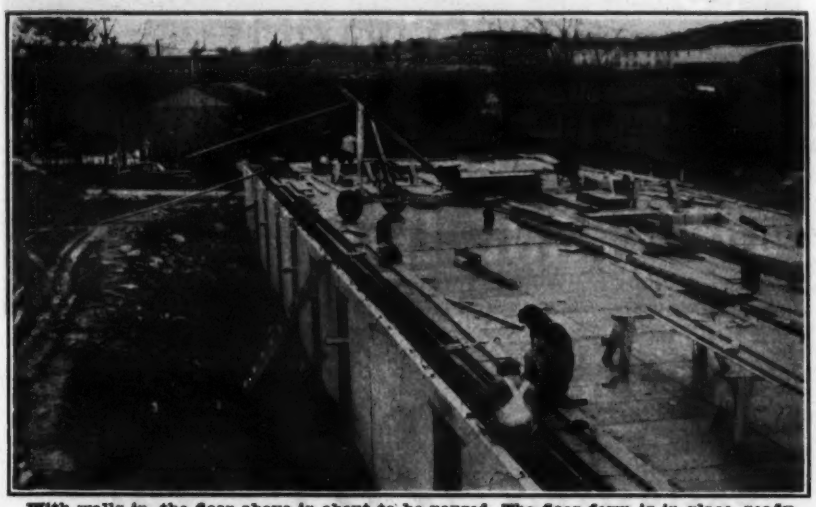


One of the precast concrete slabs used for exterior and interior walls in the eight new men's dormitories recently built at the University of Connecticut is lowered by crane onto the poured-in-place foundation walls and basement floors.

Here a precast partition slab is fitted into a slot left in the braced centering. Steel hooks embedded in each panel at the time it was cast make it easy to handle. McKim, Mead & White, New York City architects, designed the dormitories.



With walls in, the floor above is about to be poured. The floor form is in place, ready for reinforcing steel, and a stiffleg derrick for handling small panels is in evidence.

Three floors later, notice the centering on the top floor, some of the spandrel panels in place under the windows, and the pipe sections in the ground outside basement windows.

The step construction of the buildings, both horizontal and vertical, kept hillside excavation to a minimum and provides the maximum in natural lighting and ventilation.

I-beam outriggers cantilevered over the roof cornice support the bricklayers' scaffolding by cables. Between the brick and the concrete is a 2-inch insulating cavity.

Ten months from the start of the job, the eighth building nears completion, as bricklayers working from Patent scaffolding lay a 4-inch wall of red brick facing.

north end is higher, and located slightly more to the east or to the center of the two groups. The buildings of a group are connected; thus the first floor of building 1 is on a level with the basement of building 3 because of the topography. The first floor of building 3, in turn, leads into the basement of building 5, and so on up the hill. The top or fourth floor of building 1 is level with the third floor of building 3.

A similar arrangement was followed in the second group of four buildings along the east side of the hill. Buildings 2, 4, 6, and 8 are directly across from buildings 1, 3, 5, and 7 respectively. The horizontal stepping in towards the center makes buildings 1 and 2 the farthest apart, with buildings 7 and 8, near the top of the hill, the closest together.

Three additional buildings are now under construction at the north end of the present layout. The plan calls for a dormitory on each side, extending out from buildings 7 and 8. The two buildings are to be connected by a dining hall of the same size and type of construction. The 11-building group will then have the shape roughly of a horseshoe, with the open end on the south between buildings 1 and 2.

The step-construction pattern, both horizontal and vertical, provides the maximum in natural lighting and ventilation to all parts of the buildings, including the basement rooms. Where the contour of the ground does not always permit the basement walls to be above ground level, wells of a semicircular section of precast-concrete pipe are placed vertically in the ground outside the basement windows. Underneath the basements of all buildings is crawl space to accommodate service facilities such as steam lines, water mains, sewer pipe, electrical conduits, etc. The dormitories are heated with steam furnished by a central boiler room. Grassy lawns extend out from the sides of the buildings to a driveway which encircles the entire project.

Fireproof Construction

The buildings discussed here are for the use of men only—usually two to a room, although there are some single rooms in the project. Of the 1,253 students accommodated in the eight buildings, there are 170 in unit 1; 166 each in units 3, 5, and 7; 141 in unit 8; and 148 each in units 2, 4, and 6. The completion of the three units at the top of the group will provide accommodation for an additional 307 students, and dining-room accommodation for all of the 1,560 students living in the project. Total enrollment at the University of Connecticut exceeds 9,700. The gross floor area in units 1 to 8 inclusive is 187,183 square feet, which, with the 82,978 square feet in units 9, 10, and 11, gives a total gross floor area of 270,161 square feet of completely fireproof construction.

The dormitories follow a general design, with rooms on each side of a central corridor running the length of the buildings. The foundation consists of spread footings, 2 feet 8 inches in width, with two other bearing foundation walls through the center, lengthwise of each building, to support the corridor walls which are 5 feet apart. The concrete foundation walls are poured in place, as is the 5-inch-deep reinforced-concrete basement-floor slab.

Rising from the basement-floor slab and supported on the foundation footings are the reinforced-concrete precast slabs which form the sides of the buildings. Other precast slabs form the long central corridors and the partitions between the rooms. The first-floor slab, together with the second, third, fourth, and roof slabs, are of reinforced poured-in-place concrete 4½ inches deep. These slabs were all poured integrally with marginal beams running around the perimeter of the building and tying the structure together. The marginal beams at the floor slabs are 10 inches wide x 1 foot 6 inches deep. At the roof, the marginal beam is also 10 inches wide, but has the greater depth of 2 feet 4 inches.

The precast slabs forming the exterior basement walls were poured in sand molds which gave a smooth masonrylike appearance to the lower portion of the building. From the first floor up, the precast slabs are covered over with 4-inch red-brick veneer. A 2-inch space, for insulation against heat and cold and also to provide a dampness barrier, is left between the precast walls and the brick covering.

Precast-Slab Technique

In this precast technique, panels have been cast at the job site, but on the Storrs, Conn., project they were cast at a central mixing plant 60 miles from the site. The construction process developed is best described as "edge slab construction", since all vertical panels are cast flat, using edge-forms only, and are set on edge in the building. The

(*Continued on next page*)

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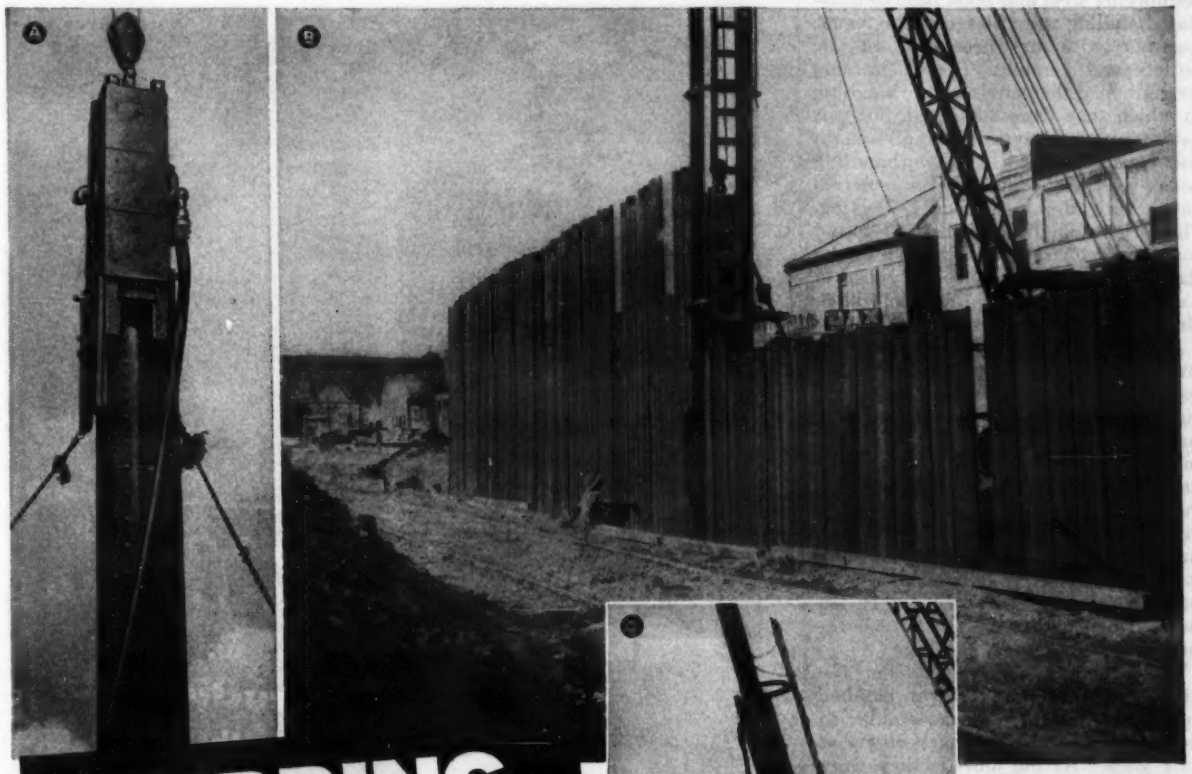

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(A) Berwick, La. McKiernan-Terry Double-Acting Pile Hammer, in "pants" guide, driving foundation piling for the new floodwall. (B) McKiernan-Terry Hammer driving 20-ft. steel sheet piling for the Morgan City floodwall. (C) Driving timber batter piles, to care for the overturning moment, Morgan City. Contractors: Morgan City, Keller Const. Co. Berwick, Hendry Corp. Photos courtesy U. S. Engineers.

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McKiernan-Terry PILE HAMMERS AND EXTRACTORS

Precast Concrete Speeds Building Work

(*Continued from preceding page*)

panels are cast one on top of the other in "sandwich" fashion. The shapes of the panels are kept to a minimum so as to take advantage of the economy in this method of casting. With adequate casting beds, panels of various sizes can be cast in one operation.

Naturally, the panels vary in size and thickness depending upon their structural use in the building. Panels for the outside walls are 8 inches thick; 6-inch panels are used for the corridors; and 4-inch panels make up the partitions. As the average room is 11 x 14 x 8 feet 1½ inches high, the maximum-size panel was a partition panel 4 inches thick x 8 feet 1½ inches x 13 feet 11½ inches. On the Vermont job, panels up to 8 feet in height and 28 feet long have been successfully cast and placed in position.

Casting beds for the panels consist of solid, level, smooth platforms on which the steel edge forms were set up. Then reinforcing steel and hook bars to facilitate handling were placed in the forms, together with the necessary electric outlets and conduit. The reinforcing strengthened the panels for the handling to which they were subjected, but was not required as far as bearing strength was concerned. At least two handling hooks were embedded in each concrete panel with the loop ends projecting. The forms were filled with 2,500-pound controlled concrete, and the top of the slab was screeded and steel-troweled to a surface as smooth as a normal white-plaster finish.

After about 24 hours had been allowed for curing, a separating medium was applied to the troweled surface of the panel. An additional set of edge forms was erected above the lower set, and the process of setting reinforcing steel, pouring concrete, and finishing was repeated. The upper troweled and treated surface of the lower panel produced a similar smooth surface on the bottom face of the upper panel. As many as six panels have been so "sandwiched", and this is not necessarily the limit of such placing.

The panels were hauled from the mixing plant to the job on flat-bed trucks equipped with racks similar to those used in transporting sections of plate glass. At the job site they were unloaded by cranes and stacked leaning against supports which were placed around the project.

Slabs Poured in Place

The footings, foundation walls, and all floor and roof slabs are poured-in-place reinforced concrete, constructed in conventional style. Economies were effected by designing and pouring continuous slabs wherever possible. Truck-mixed concrete was supplied from a commercial plant located only a few miles from the University. Care was taken to make certain that the forms for the floor slabs were always in smooth condition. After the forms were removed, fins and rough spots were ground if necessary, and finished to a smoothness equivalent to that of white plaster. Where acoustical tile is applied, fins projecting not over ⅛ inch are permissible. Floor surfaces were steel-troweled smooth and generally finished with asphalt tile.

After the floor slabs were poured, the precast panels for corridor walls, exterior walls, and separating walls were placed, and then the next floor slab and marginal beams were poured. This procedure of first erecting the walls and then pouring the floor above is the direct reverse of the conventional method used in building construction, where the floors are laid first and the walls are built next.

Panels were numbered to facilitate handling and placing, and after a 7-day curing period, they were set in place by three Lorain Moto-Cranes and one crawler crane. Wooden bracing, and in some cases the centering for the succeeding floor slab, supported the precast panels until they were finally anchored in place. The steel handling hooks, and ½ inch of the concrete at the top of the panel, were cast into and made integral with the floor slab bearing upon them. Vertical joints between panels are butted and pointed, and needed no permanent anchorage. Special panels, such as spandrel panels under windows and lintel panels over doors, have special anchorage. Some of these smaller panels were set by a small stiffleg derrick, mounted on rubber-tired wheels, which was easily moved around on the floor slabs.

Exterior and Interior

The 4-inch wall of brick facing was selected in order to harmonize with existing campus buildings. The brick

(*Continued on next page*)

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C. & E. M. Photo
Here's a finished room on the first floor of dormitory building 5.

was set 2 inches away from the concrete panels to form a cavity wall. The facing was tied to the panels by conventional brick anchors dovetailed into the precast slabs. Bricks were laid from Patent scaffolding supported from the roof level by I-beams cantilevered out from the building. The long beams were fastened at one end to the roof by hooks embedded in the concrete slab. They were later burned off when no longer needed. Blocks around the edge of the roof kept the beams from bearing directly on the concrete slab.

Most of the poured-in-place concrete for the slabs was handled by crane and bottom-dump buckets. Masonry materials for the exterior walls, and glazed tile for the stairwells and toilet rooms, were raised to floor level by a 60-foot tubular steel tower lift powered by a National two-drum hoist. The roof slabs have a slight pitch of 1½ inches and were given a Fiberglas insulation and a tar and gravel topping.

Inside the buildings, the doors consist of a steel buck and frame which is slid down over the ends of the panels from above and grouted in place. Windows are both wood and metal. The interior finish of the rooms is the equivalent of plaster, and has the additional advantage that surfaces are practically indestructible. All furring, lathing, and plastering were eliminated, and the walls needed only painting before the buildings were occupied. Light-colored, washable, oil-resin flat paint was used. This is a breather-type emulsion paint which permits the moisture in the concrete to get through and thus prevent blistering. In toilets, kitchens, and in some cases in stair halls, a glazed brick-tile finish has been used over the concrete panels for sanitary reasons and to reduce maintenance.

The rooms are heated with Dunham comfort-conditioning radiators, individually controlled. They are illuminated with overhead electrical fixtures in the ceiling; they are also equipped with electrical outlets in the walls near the floor. It has been found that the usual furniture and hangings in the bedrooms are adequate to create satisfactory acoustical conditions. The ceilings of the corridors are finished with glued-on sound-deadening acoustical tile. Asphalt tile was installed on the finished floors. Transmission of sound through walls and floors has not been found to create a serious problem. Each dormitory floor has a washroom containing urinals, toilets, washbasins, and showers. Each building has two combined recreation and lounging rooms.

Economy and Speed

The principal economies in this type of building construction result from three main factors. First, many of the conventional steps in construction and the work of many trades were eliminated. Second, the "sandwich" method of slab casting was employed by reason of the repetitive shapes of the concrete panels. And finally, new standards for college dormitories were adopted.

Some of these new standards include the setting of the clear ceiling height at 8 feet 1½ inches, which results in a considerable saving in space, heating, plumbing and electric risers, masonry, and painting. No columns, girders, or beams are required to project below ceiling slabs. Furring and plaster are eliminated and the concrete surfaces are simply painted. Two students occupy one room, and wardrobes take the place of built-in closets. Insulated flat

(*Concluded on next page, Col. 2*)

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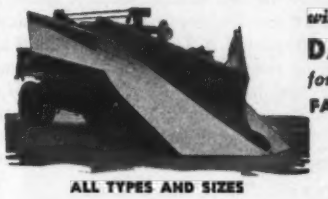

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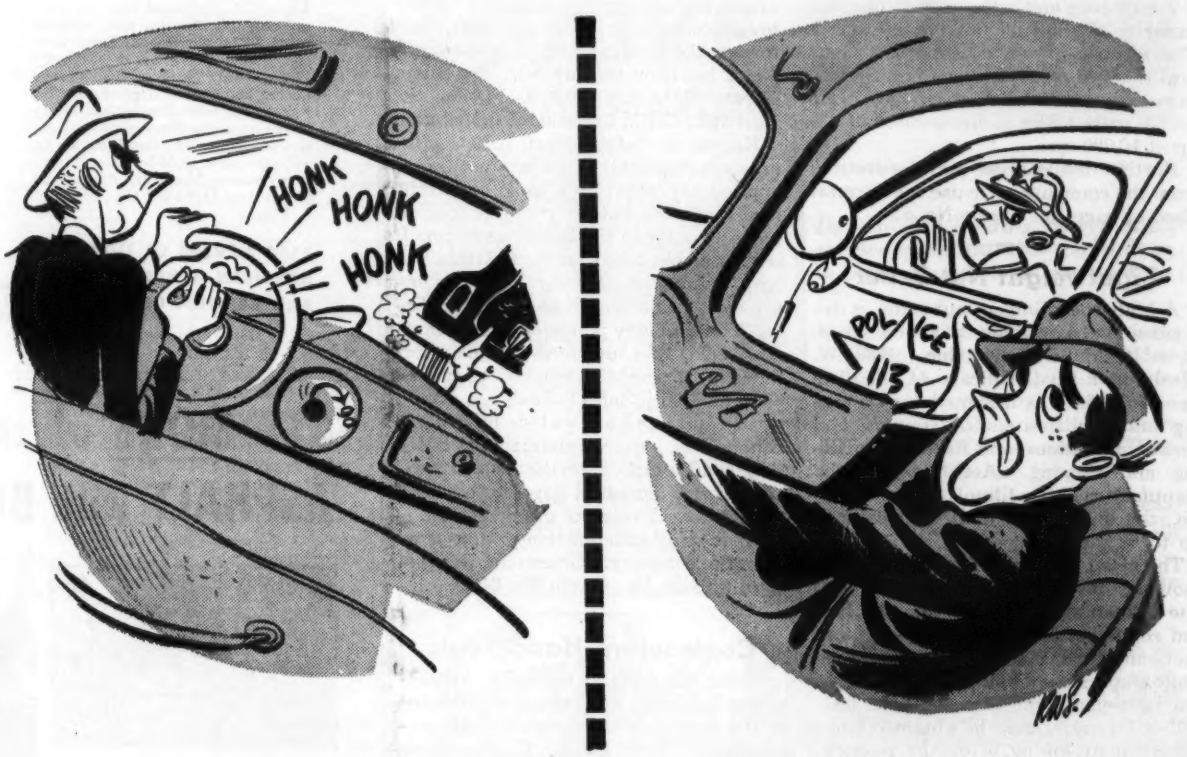

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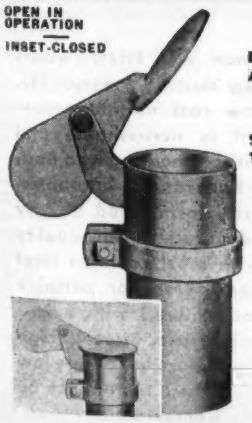

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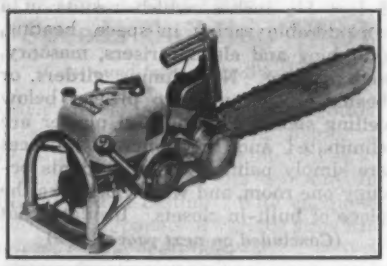

Trees up to 4 feet in diameter are handled by this new Woodboss power chain saw.

Power Chain Saws

A lightweight power chain saw is distributed by Woodboss, Inc., 2712 N. Mississippi Ave., Portland 12, Oreg. The Woodboss saw will handle trees up to 4 feet in diameter, the manufacturer states, and can be used for felling, bucking, limbing, or undercutting. It weighs 37 pounds. Cutting bars are available in 14, 20, 26, and 32-inch lengths.

The 1-cylinder 2-cycle gasoline engine is rated at 4 hp at 3,800 rpm. It is equipped with a Dynal starter and has a 2-inch bore and a 1¾-inch stroke; the capacity of the fuel tank is one quart. The electric-driven model has a General Electric motor and can be provided in ac or dc models for operation on 110 or 220 volts. The motor is rated at 1¾ hp at 10,000 rpm.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 5.

Lightweight Nut Setter

A high-speed impact nut setter is described in a catalog available from Speed-O-Matic Sales, Inc., 4639 W. Washington Blvd., Chicago 44, Ill. The Speed-O-Matic is designed for removing nuts, bolts, studs, lag screws, and similar operations, and for use in drilling and tapping. According to the manufacturer, the Illinois Gage & Mfg. Co., the tool can be used with bolts of up to ¾ inch.

The catalog features a cut-away view showing the construction of the unit. The Silman steel forgings and the ball and roller bearings comprising the impact unit are pictured, and another photograph shows how the impact unit can be replaced in 45 seconds or less.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 107.

Precast Concrete Speeds Building Work

(Continued from preceding page)

roofs rather than hip or gable roofs are designed and built. Toilet-fixture ratio is reduced to the minimum found satisfactory to the occupants. Electrical work is also kept to the minimum; yet each student room is provided with two duplex convenience outlets and one lighting outlet.

As for speed of construction, the eight buildings in the first group of dormitories at the University of Connecticut were completed in December, 1948, well ahead of the time limit of the contract which had been set for late February, 1949. Students occupied the first four buildings in September, 1948, and occupancy of the last four buildings was realized in December, 1948.

Protects Ignition Against Damp, Cold

A new development designed to improve engine performance and reduce breakdowns and repairs of trucks, tractors, trailers, cars, and stationary engines, has been announced. The Silver Booster Mfg. Co., 812 S. Flower St., Burbank, Calif., is national distributor.

Known as Safe-T-Seal, it is a non-inflammable semi-liquid product that is applied to sparkplugs, coils, distributors, magnetos, battery posts and cables, and all wiring in the ignition system. It seals the electrical current within the ignition system, thereby assuring improved spark strength and constant firing. The company points out that dampness, cold, rain, or snow do not affect the functioning of an ignition system processed with Safe-T-Seal; not even a steady stream of water affects it. Among the features claimed for Safe-T-Seal are quicker starting, more "pep" and power, increased gasoline efficiency, and less dilution of crankcase oil.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 84.

Contractors' Hand Tools

A line of specialty tools for contractors is described in a catalog distributed by the Atlantic Steel Corp., 1775 Broadway, New York 19, N. Y. The tools include a special pneumatic rock breaker, a pneumatic pipe driver, moil points, chisel points, asphalt cutters, digging chisels, hollow drill steels and rods, chisel blanks, and hand bars.

Each of the tools is illustrated and described in the booklet. Information is provided on the size of steel; length, diameter, and type of shank; standard length under the collar; and weight. In the case of the rock breaker and pipe driver, a special 2-page spread for each lists its features, method of operation, and the sizes in which each is available.

This literature may be secured from the company, or by using the Request Card at page 16. Circle No. 21.

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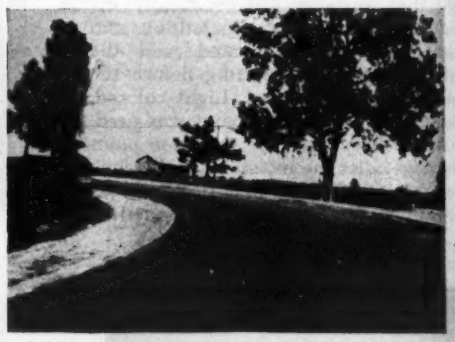

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Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

No Reimbursement When Highway Slopes Restaked

THE PROBLEM: *A highway contractor had to recut backslopes when Government engineers restaked the slopes after they had been cut according to the original plans. In the absence of proof that an unreasonable burden was placed upon the contractor, was he entitled to reimbursement for extra cost?*

THE ANSWER: No, decided the United States Court of Claims. (First-Citizens Bank & Trust Co. v. United States, 76 Fed. Supp. 250.) The Court said:

"The recutting of slopes . . . was confined to such operations as were necessary to furnish sufficient material to construct the roadway and fills within the contract requirements. The slopes were not laid back a second or third time" to achieve "a final contour different from that shown on the contract drawings. Nor was it done . . . to complete additional fills or additional roadway not called for by the plans.

"Viewing the contract documents as a whole, it cannot be said that the parties . . . contemplated that balance points established by the engineers, as shown on the plans, would prove to be perfect, and that any deviations therefrom would, regardless of the cause or extent thereof, be deemed changes in the contract for which plaintiff would be entitled to ask compensation on some other basis than the unit price for excavation fixed by the contract. The specifications plainly contemplated that the estimated amounts of material within the various balance points indicated on the drawings might not work out in practice . . .

"We do not imply that such a provision for deviation from the drawings is to be availed of by defendant beyond reasonable limits, or in such a fashion as to place upon plaintiff, of necessity, a burden of performance which may not be regarded as having been fairly" contemplated by "the parties when they entered into the contract. . . . It is conceivable that the estimates of the engineers with respect to the various balance points might have been so erroneous that recourse to the provision for permitting alteration in the plans would be little short of a remolding of the contract. In such a case we would be warranted in finding a basis for some equitable adjustment of the price due plaintiff for the added expense resulting from such erroneous plans. . . .

"Little more appears than that the recutting of the slopes resulted from the inability of defendant's engineers to anticipate to an exact degree prior to actual construction just how much the slopes at a given point on the highway would have to be cut in order to construct the necessary fills in the adjacent sections of the highway."

The Court of Claims stressed the fact that the contractor did not protest the changes in the slopes when they were made. Nor did he claim that they constituted such changes in the contract as to require an equitable adjustment of the contract price. The Court said that it was "not possible from the standpoint of the evidence to ignore totally such provisions of the contract which intended to provide a means for determining what work the contractor considered was being required of him beyond that initially contemplated by the contract. Had plaintiff protested and insisted upon written orders for the recutting of the slopes to newly set stakes, and asserted a claim for adjustment of the price to be paid for such work, defendant's engineers might have directed plaintiff to open borrow pits, as they were authorized by the contract to do."

The Court added that even if there had been proof of right to an adjustment, plaintiff failed to prove a proper basis for measuring the allowance to be made. The Court said: "We cannot substitute for proof of a cost greater than that involved in the normal slope-cutting operations a mere computation by plaintiff based upon an estimate of the number of additional hours of time which were required for the recutting operations, which estimate in turn rests only on plaintiff's belief that these latter operations required twice as much time to perform per unit of work as the normal operations. In concluding that plaintiff's proof in this respect is insufficient, we do not depart from the adopted legal principle that damages are not rendered uncertain because they cannot be calculated with absolute exactness, and that it is sufficient if a reasonable basis of computation is afforded, although . . . approximate."

Contractor Was Upheld In a Factual Dispute

THE PROBLEM: *A Government contractor brought suit for additional pay for excavation. During the suit he testified that he had protested the work as not covered by his contract and had asked written instructions from the Government's representatives. His testimony was disputed by the defendant. In whose favor did the evidence weigh?*

THE ANSWER: In favor of the contractor, decided the United States Court of Claims. (Orino v. United States, 77 Fed. Supp. 938.) Said the court:

"Written protest was required only after the written instructions were given. The contractor and his superintendent were familiar with the provisions and requirements of the contract and specifications. . . . Plaintiff was an experienced contractor and he made special trips to the project. . . . In view of the nature and cost of the work involved in the inspector's ruling, which was approved by the acting construction engineer, and the lack of any reasonable disclosure or requirement in the contract that it was part of the work to be performed . . . it would be unreasonable to suppose that an experienced contractor would fail to protest and ask for written instructions. . . . The testimony cannot be reconciled, and under the well established rule of law applicable to such a situation, we accept as true the testimony of the contractor and his superintendent and reject that of defendant's witnesses on this point. We are convinced from a study of the entire record and the circumstantial facts that defendant's witnesses were never quite sure of the correctness of their ruling that the contract called for this work and required plaintiff to perform it, and they hoped to force plaintiff to perform it for $1.25 a cubic yard relating to other and entirely dissimilar work. They showed evidence of being biased rather than frank and fair in their testimony, and indicated a desire to sustain their ruling and avoid payment of a fair price on the basis of a technicality."

However, under distinct claims for additional pay for other work under the same contract, it was decided that the contractor failed to preserve a proper basis for those claims, on a theory of extra work. Said the court: "The facts disclose that the contractor protested the decision that he was not entitled to payment, but there is no claim that he requested written instructions or decision regarding the excavation and concrete work in question. He did not make a written protest that such work involved a change in the plans or specifications or was work outside that called for by the contract. No written order was issued by or demanded of any representative of the Government authorized to alter or add to the contract price regarding the work on which these two items of claim are founded. In order for plaintiff to recover, it must appear that there was no occasion for protest by the contractor against being required to do such work, nor any reason why the contractor should have insisted upon written instructions or order for the same as though it involved extra work; in other words, that the work involved in

(*Concluded on next page*)

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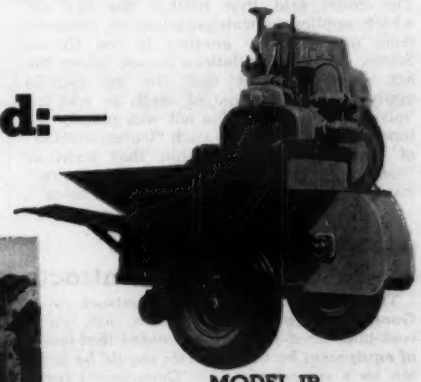

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Avoid Legal Pitfalls

(Continued from preceding page)

these two items of claim was regular contract work for which, upon performance thereof, the contract expressly promised payment at the applicable unit prices provided therein."

Levee Contractor Enters Uncondemned Private Land

THE PROBLEM: *Was a Government-levee contractor liable to the owner of land for entering upon it and constructing a levee before the Government had formally condemned the land or otherwise acquired the right to build the levee?*

THE ANSWER: No, decided the Oklahoma Supreme Court. (Garrett v. Jones, 200 Pac. 2d 402.) The gist of the decision is as follows:

"Congress, acting within its constitutional power, authorized the War Department to cause the construction of flood-control projects such as the levees built by defendant, and authorized the taking of lands for such purposes for which the Government upon the taking has promised compensation. The fact that those charged with the execution of the Act of Congress may have caused construction to commence on a project located on private property without having negotiated an easement or having formally instituted a proceeding in condemnation does not affect the validity of the Act. . . .

"Whether it be considered that the taking of plaintiff's land commenced upon the passage of the Act authorizing such construction and taking, or when the United States Engineers had completed its survey and staked that land and awarded a contract for the construction, or when the defendant entered her premises, the effect is the same.

"The taking was for the public use and authorized by a valid statute. Any asserted wrongful act of an officer, agent, or contractor of the Government in the method or manner of the taking, resting on their failure to secure permission from the owner or compensate the owner for the taking, was adopted by the sovereign power when and as committed and causes such act . . . to be a right appropriation by the Government, for which compensation is provided, and thus operates to relieve such agent or contractor from liability for the taking.

"The defendant, a Government contractor, acting under authority validly conferred in relation to the taking of plaintiff's land, and not having exceeded his authority in the performance of the work done on the land, is not liable to plaintiff for the land taken."

Contractor Not Subject To Transportation Tax

THE PROBLEM: *Was a contractor subject to Federal transportation tax on trucks hired from and used by a subcontractor at an hourly rate for hauling earth used in grading airfields?*

THE ANSWER: No, said the United States District Court, Northern District of Georgia. (Lyle v. United States, 76 Fed. Supp. 787.) The court said that neither the tax act which applies to transportation of property from one point to another in the United States, nor the regulations issued under the act, evinced intent that the tax should apply to such haulage of earth as was involved in this case. The act was plainly intended to apply only to such "transportation" of property as falls within that term as "commonly understood in the light of present-day transportation practices and custom".

Informal Amendments Of Federal Contracts

THE PROBLEM: *The prime contract on a Government plant construction job, on a cost-plus-fixed-fee basis, provided that leases of equipment by third parties should be written on a stereotyped War Department form. An original lease was so written, but subsequent orders and proposals were signed by the prime contractors and the furnishers of additional equipment. They were approved by a government representative, being treated as amendments to the original lease. Were such orders and proposals valid?*

THE ANSWER: Yes, said the United States Court of Claims. (Corum v. United States, 81 Fed. Supp. 728.) Speaking of the supplementary documents, the court said that "they were as valid as if each one of them had been newly written on the stereotyped War Department form".

What Constitutes "Damage" To Siphon When Insured?

THE PROBLEM: *An irrigation-canal contractor secured a policy insuring against "damage" to a siphon culvert used to conduct water under a river. Flood conditions caused the siphon to fill and clog up. Did the policy cover this loss?*

THE ANSWER: Yes, decided the United States Court of Appeals, Eighth Circuit. (Morrison-Knudsen Co. v. Phoenix Ins. Co., Hartford, Conn., 172 Fed. 2d 124.) Said the court:

"This policy was on a form prepared by the defendant and in case of any doubt or uncertainty as to its meaning, it must be interpreted against the party who has drawn it."

The siphon "was only a part of the entire project under construction. It was in form an inverted siphon. Its purpose was to conduct water under the river so as to make it available for irrigation purposes . . . It had not been completed when the flood occurred. When the flood waters filled this siphon with mud, stone, and debris, it was rendered useless and entirely ineffective as a siphon, and that was the only purpose for which it was being built. It certainly could not have been turned over . . . as a finished product. Manifestly, before it could be accepted as such, it was necessary that this debris be removed therefrom. The filling of the siphon was therefore 'damage' to the siphon. True, the material in the siphon may have been intact, but it was no longer a conduit of water and could not be made such without removing the materials which had been forced into it by the flood waters. . . . The very purpose of taking out the insurance was to guard against damage by the flood waters and this purpose was known to the defendant's agent. . . . The mere fact that the parties may disagree as to how the contract should be read does not warrant a rescission of the contract."

Mistake in Addressing Bid

THE PROBLEM: *A subcontractor's bid was addressed to "John Traff Construction Co". It was accepted by John Traff, there being no corporation of that name. Could the subcontractor deny the existence of a binding contract, on the ground that the bid was not accepted by the party to whom it was addressed?*

THE ANSWER: No, decided the Illinois Appellate Court, First District. (Traff v. Fabro, 84 N. E. 2d 874.) The court reasoned that the bidder did not contemplate a definite person when he made his bid to a general contractor who was listed in a trade journal and whose name was unknown to him. His purpose was to submit a bid to the general contractor who might be awarded a general contract. "Under these circumstances, the character, credit, or substance of the person with whom defendant [the bidder] contracted could not have been an inducement to defendant to make his proposal to plaintiff [the general contractor]. Moreover, during the negotiations between the parties after plaintiff accepted defendant's proposal, no objection was ever raised by defendant as to the identity of plaintiff."

But the court fully recognized that where one reasonably supposes that he is contracting with one person he cannot have another person thrust upon him, especially when he reposes particular trust in the credit, character, etc., of the first person.

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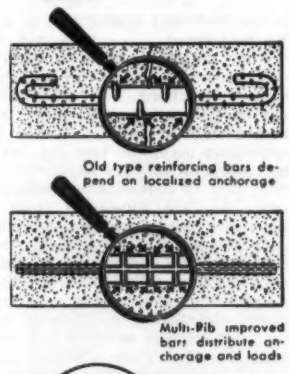

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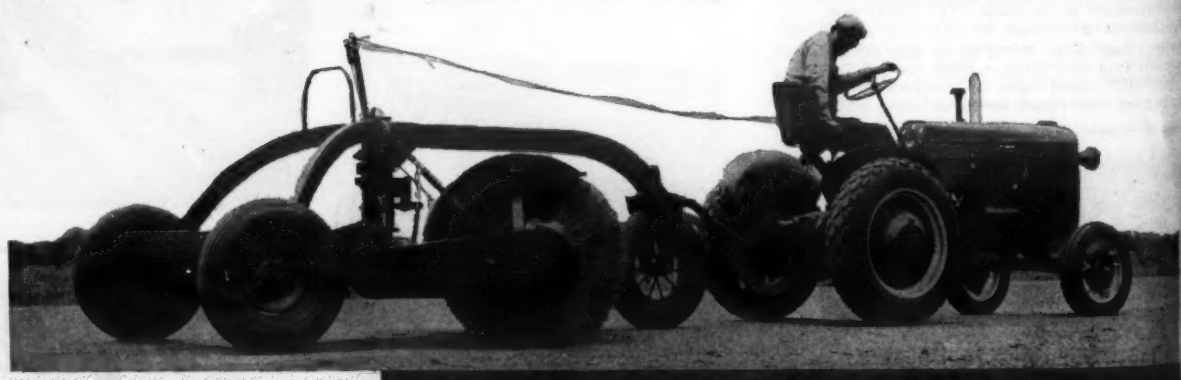

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The Devere concrete sprayer uses eight spray heads to treat a 6-foot strip of concrete with curing compound. The extra side nozzle which sprays horizontally treats the edge of the slab.

Concrete-Spray Unit Covers 6-Foot Strip

A machine for high-speed concrete spraying is announced by the Devere Co. of Racine, Wis. The Devere spray unit is equipped with eight spray heads which simultaneously treat a 6-foot strip of concrete. An extra side nozzle, set to spray in a horizontal direction, treats the edges of concrete surfaces.

Tank, pump, and power unit are mounted on an all-steel 2-wheeled chassis. The tank has a 10-gallon capacity and a relief pressure return to the tank. The tank is of the self-loading type, and curing compounds can be pumped directly into it from the barrel.

Standard equipment includes 50 feet of hose, together with a single-nozzle boom for spraying inaccessible places such as curbs, gutters, doorways, etc. Available as extra equipment is an adjustable boom which may be used for spraying concrete while it is still too soft to be walked on, or other places where the 2-wheeled chassis cannot go.

Further information may be secured from the company, or by using the Request Card at page 16. Circle No. 81.

Detailed Service Manual For Grader Maintenance

A service manual on the operation, maintenance, and major repairing of AD-3 and AD-4 motor graders has been brought out by the Allis-Chalmers Mfg. Co. This 278-page book contains 26 different sections on all phases of the subject ranging from descriptions and specifications to fits and tolerances.

The first 4 sections contain a description of the graders and illustrated information and instructions on operation and preventive maintenance. The next 20 sections cover in detail the various assemblies of the graders, and tell how to adjust, repair, and rebuild them. Section 25 deals with fits and tolerances of parts when they are new, and the amount of wear permissible before the part must be replaced. Line drawings, cut-away views, exploded-part views, and engravings simplify the manual and its instructions.

Copies of the manual can be purchased at a price of $4.00. They are available at Allis-Chalmers dealers, or by writing to the company at Box 512, Milwaukee 1, Wis.

Electric Steam Cleaner

A steam-jet cleaner with an effective pressure up to 200 psi is manufactured by the Livingstone Engineering Co., 100 Grove St., Worcester 5, Mass. Other features claimed for the Speedylectric include high jet velocity, powerful blast action, and the fact that the cleaning solvent is atomized with steam at the jet.

The catalog treats each of these features in detail, and explains the safety aspects of the electrically operated unit, its rugged construction, its dependability, and some of its recommended uses. Specifications listed for the Model JC-30 cover the steam supply, boiler water supply, detergent supply, hose, steam lance, power unit and electrical connections, and size and weight.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 117.

Drafting Instruments

A complete line of precision drafting instruments is available from Borden & Riley Paper Co., Inc., 60 E. 11th St., New York 3, N. Y., which has been appointed exclusive American representative of the Kern Co., Ltd. of Switzerland.

The Kern instruments are made of triple-plated chrome over hard nickel silver. They are also available in solid nickel silver and brass nickel plate. The Kern compass has an adjustable lead chuck which permits leads of all diameters and all degrees of hardness to be used. Other special features of the instruments include precision center control wheels for hairline adjustments, and dividers with either standard or hair springs. The Kern instruments are available singly or in sets as desired.

This Kern instrument set contains two ruling pens, a screwdriver, leadholder, compass pen, divider, extension bar for the compass, compass, bow divider, bow pen, and bow pencil.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 94.

New Post for C. E. Heywood

Charles E. Heywood has been appointed Service Engineer by the Elastic Stop Nut Corp. of America, Union, N. J. He was previously associated with the Chance Vought Division of United Aircraft Corp. as Standards Engineer.

Swinging the Big Sticks with

VICKERS Hydraulic POWER STEERING

GERLINGER MATERIAL CARRIER

Another Cost-Cutting Application of VICKERS HYDRAULICS

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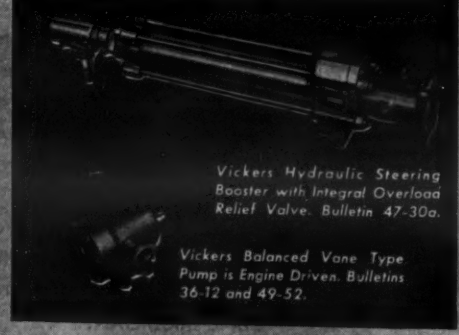

Vickers Hydraulic Steering Booster with Integral Overload Relief Valve. Bulletin 47-30a.

Vickers Balanced Vane Type Pump is Engine Driven. Bulletins 36-12 and 49-52.

Vickers Hydraulic Power Steering makes it easier and cheaper to handle logs and large piles of lumber with the Gerlinger Material Carrier. Four Wheel Steering is effortless in spite of very heavy front wheel loading. The quick, easy maneuverability speeds operation . . . substantially lowers materials handling costs.

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Vickers Hydraulic Power Steering is saving money for the users of carriers, trucks, road machinery and other mobile equipment . . . not only by speeding operation, but also by reducing driver fatigue. For detailed information, ask for Bulletin 47-30a.

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

C. & E. M. Photo
Earth-movers build up the embankment of Union Village Dam in eastern Vermont. And can you see the Manitowoc Speederane, in the center of the picture, digging the hole for an observation well?

Dirt-Movers Build Union Village Dam

(Continued from page 1)

with work inside the tunnel, they slowed down the highway grading to a considerable extent. The Corps of Engineers had awarded a $405,000 contract for the relocation of 3½ miles of this highway to N. D. Maselli Corp. of Bloomfield, Conn., which in turn subbed the job to John Gallo of Sagamore, Mass.

The new road has a gravel base, with a 2½-inch mixed-in-place surface course of tar and crushed gravel, 20 feet in width. It starts one mile below Union Village at the existing road that ties in to U. S. 5, 3 miles to the south. The new alignment climbs along the right bank of the dam site, staying on high ground until it crosses the Ompomanoosuc River on a new bridge at the head of the reservoir area, and rejoins the old road that continues to South Strafford. The concrete and steel bridge has three 75-foot spans for a total length of 225 feet, and was constructed by Kenneth E. Curran, Inc., of Littleton, N. H., under a $95,000 contract to the Corps of Engineers.

Work Starts on Dam

Although the road was not finished at the time of the river diversion, work got started on the dam nonetheless. The site was dewatered—it practically drained itself, anyway—and the foundation area was cleaned up. The permanent upstream cofferdam was then constructed across the river with its center line 383 feet above the axis of the dam. This cofferdam was built up to elevation 444, which is 24 feet higher than the invert elevation of the tunnel intake channel. It has 2½ to 1 side slopes, and eventually became entirely contained within the upstream toe of the big embankment.

A cut-off trench 20 feet wide at the bottom was then excavated to rock along the center line of the dam. Grout holes 20 feet deep on 20-foot centers were drilled into the rock from the bottom of the trench, and two Gardner-Denver grouting machines filled the holes and any cracks or crevices in the rock below the dam. The rock was apparently tight, with little tendency to seaming, for the amount of grout that was pumped into the holes was small.

Traffic still had to be provided for, despite the construction on the dam, until the highway relocation was completed. During the early stages of embankment work, vehicles using the road climbed up one side of the fill and down the other, during which they were called upon to make a couple of right-angle turns. These ramps had to be maintained in good shape for the cars and trucks plying the river route. Everybody involved was relieved, therefore, when on June 26 the relocated highway was completed and ready to accommodate traffic. By that time the embankment had reached a height of 30 feet across the valley.

Rolled-Earth Embankment

The core of the dam is select impervious material with ½ to 1 side slopes to elevation 580, where the core is 10 feet in width. On both sides of the core are shoulders of random material which have 2¼ to 1 slopes to elevation 571.5, and are flanked on the outside by pervious sections to the top of the dam at elevation 584. Up to elevation 564, that of the spillway crest, the outside slopes are 3 to 1, while the rest of the way to the top the slopes are 2½ to 1.

The 30-foot crown width on top of the dam accommodates a 25-foot road that

(Continued on next page)

C. & E. M. Photo
Ingersoll-Rand and Worthington wagon drills put down snake holes in the rock-cut spillway section of Union Village Dam. The two Blue Brute 500-cfm compressors supply air.

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EQUIPPED WITH J. I. CASE ENGINES

Precision construction and dependable components based on sound, experienced engineering make these units sturdy, efficient and economical. 3 sizes from 10 KW to 30 KW.

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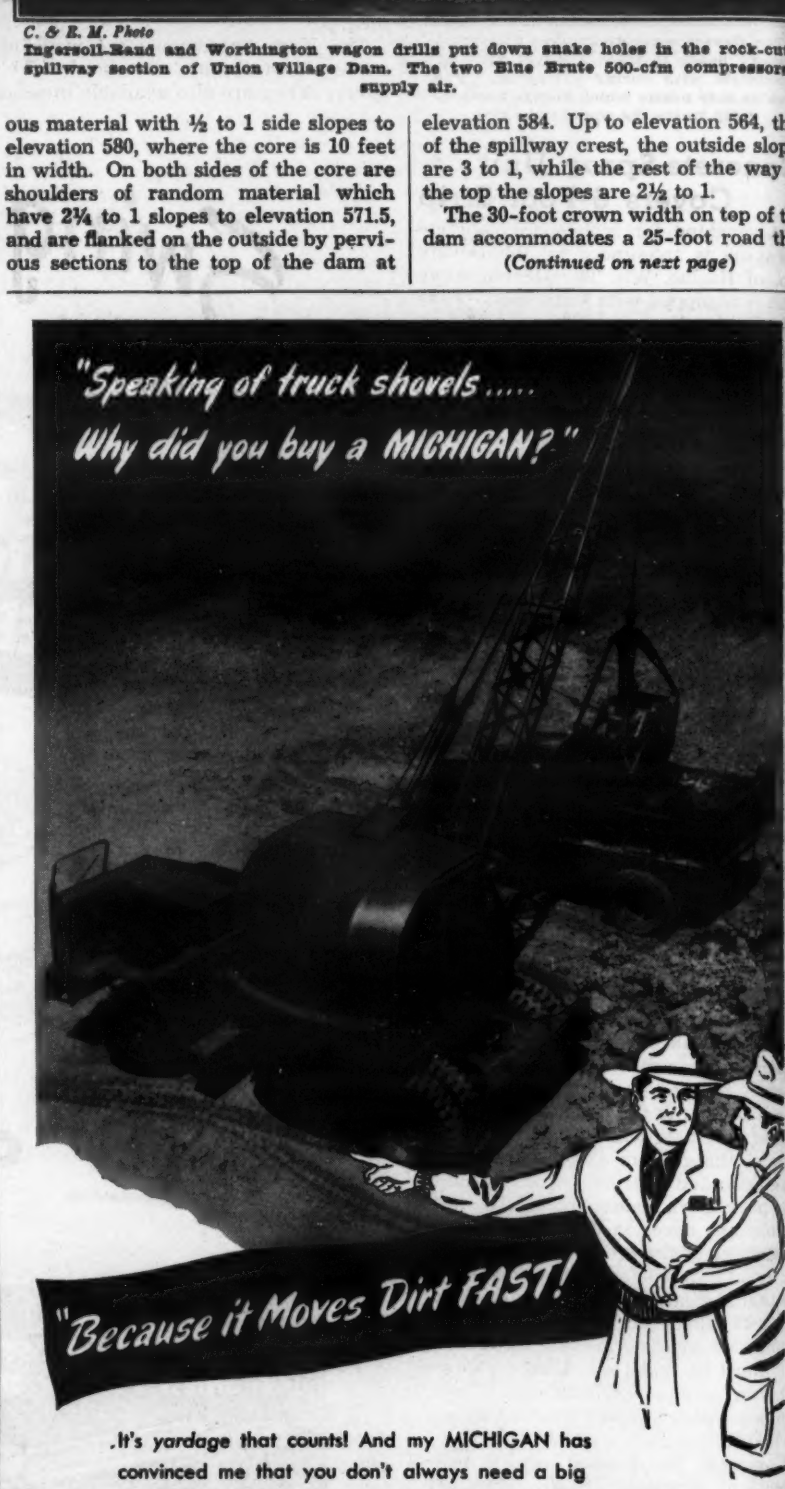

.It's *yardage* that counts! And my MICHIGAN has convinced me that you don't always need a big dipper to get big yardage. No matter what I put her on—sand, gravel, clay, rock—that baby *really* goes to town! Gets out more yardage per hour than any shovel that size I've ever owned. She crowds and swings fast, and dumps fast and clean. When anyone says truck shovels to *me*, I say, 'my *next* one's a MICHIGAN, too!' For the best 'buy' in a truck shovel, get a MICHIGAN!"

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winds up the west abutment from the old road along the right bank of the river below the dam. During its ascent to the top of the embankment, the road passes the dwelling of the operator who looks after the gates in the operating house above the shaft in the tunnel. At the top of the west abutment is a rotary with a flagpole at the center, and a parking area around a portion of the perimeter. The road continues across the dam to the operating house on the east abutment.

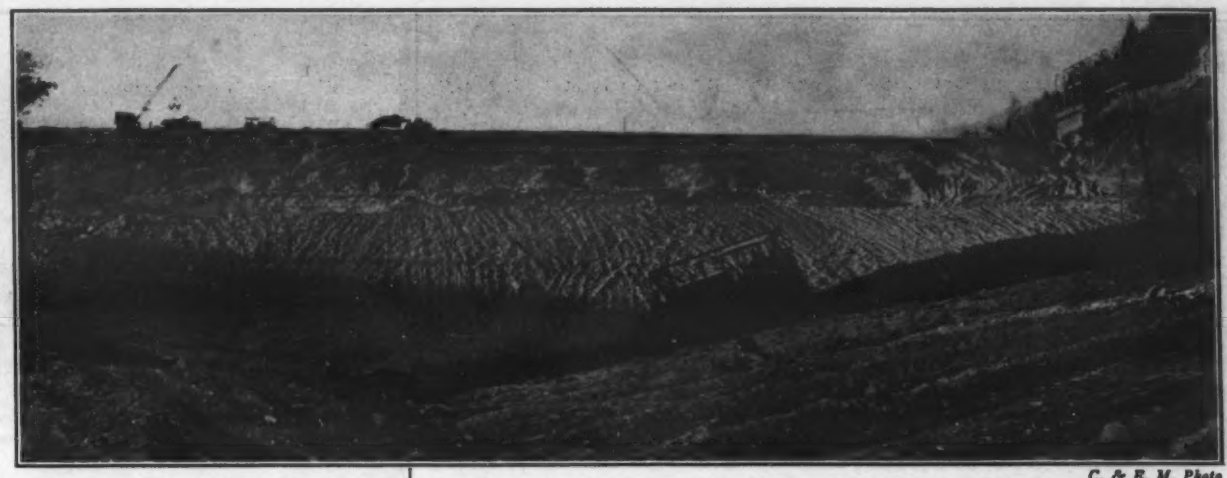
The 1,100-foot-long x 170-foot-high dam measures 1,000 feet at its widest point through the base. Its total volume of material is 1,719,000 cubic yards, of which 1,580,000 yards is dirt and the remaining 139,000 yards is rock fill. On the downstream slope 2 feet of rock was dumped on a 1-foot bed of bank-run gravel. The upstream slope protection consists of a 6-foot layer of dumped rock on a 2-foot blanket of gravel. A pervious blanket also extends about halfway under the random section to form a pervious underdrain.

The impervious core of the dam will permit the passage of only a very small amount of seepage. This seepage, after leaving the impervious core, will enter more pervious material. The line of saturation through the dam will therefore drop sharply immediately downstream of the core, and eliminate any possibility of seepage emergence or loss of stability at the downstream face. The pervious underdrains will be particularly effective in this respect. The pervious shell and underdrain in the upstream portion of the dam will act to maintain stability by providing rapid and effective drainage of the structure at times of rapid drawdown of the pool.

Material Readily Available

Material for the construction of the dam came largely from the required excavation—the inlet and outlet channels for the tunnel on the left bank, and the great curving spillway that swings around the west abutment of the dam on the right bank of the river—and from borrow pits within the site area. No material hauls exceeded ½ mile.

From the borrow pits came all the pervious and part of the random material. Two such pits were used: one very large pit was only 1,000 feet north of the center line of the dam, and the other was 2,000 feet to the south. All the impervious material, which is silty in nature, was taken from the spillway excavation, along with the remaining material required for the random fill. Over 150,000 cubic yards of rock was also excavated from the spillway and used for protecting the dam slopes and the left-hand side of the spillway above the weir.



C. & E. M. Photo

Here you're looking at the downstream slope of Union Village Dam. The D8 dozer in the foreground is leveling material used to build the downstream cofferdam.

Drill holes in the rock cuts for the spillway were made with three Ingersoll-Rand and two Worthington wagon drills powered by two Worthington Blue Brute 500-cfm and two Ingersoll-Rand 315-cfm air compressors. The schist rock was taken out in 25-foot lifts, with the holes drilled on 5-foot centers and additional snake holes or lifters drilled horizontally into the bottom of the cut from the side. At the start of the vertical holes, 5-foot lengths of drill steel 1¼ inches in diameter were used. These were increased in 5-foot increments until the desired depth was attained. I-R bits were employed in the drilling, dropping down from 2⅝ to 2 inches in size. The holes were charged with Herculese 40 and 60 per cent dynamite, and an average of 250 holes were blasted at a time.

Six shovels were on the project, working either in the required excavation areas or in the borrow pits. They included 4 Northwest shovels —2 at 2½ yards and 2 at 1½ yards—and 2 Lorain 2-yard units. A Manitowoc Speedcrane with a 60-foot boom and a 1¼-yard drag bucket also worked in the spillway cut digging out silty material for the impervious core. The rock was hauled chiefly by 5 large end-dump Euclids—4 with 17-yard capacities and one at 14

(Continued on next page)

For the Finest in Chain Saw Performance — Lombard Model 7 Two Man Saws with new Warren High Speed Chain

Dealer opportunities in some areas.

- Cuts easier because of governed chain
- Cuts faster result of unique plow-shaped teeth
- Cuts longer without dulling Teeth made of tool steel
- Local demonstration arranged!

Also One Man Saw—Available Soon

LOMBARD GOVERNOR CORP.
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CUTS CONSTRUCTION COSTS

Contractors using this marvelous new Concrete Conveyor are saving as much as 80% on the cost of pouring concrete.

CON-VAY-IT speeds the job tool *Electrically operated*, it delivers up to a cubic yard of wet concrete a minute — down, horizontally, or to a height of 8 ft. Other models are available for greater heights.

It will pay you well to put CON-VAY-IT 12-20 Concrete Special to work for you without delay—write *TODAY* for details.

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(Photo, courtesy Engineering News-Record)

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From a performance standpoint, you can't beat Naylor Pipe in dredging service.

This distinctive pipe is light in weight yet built with the lockseam spiralweld reinforcing truss to take the rough handling and battering of dredging jobs. It is easy to install, easy to handle. It can be disassembled and moved from one location to another quickly.

Combined with Naylor's Heavy Duty Wedge-Lock couplings, which speed connections, Naylor Pipe provides dredging operators with a dependable, tight, leakfree line that assures more consistent delivery and smoother operation with less power loss.

Sizes from 4" to 30" in diameter with all types of dredging connections.

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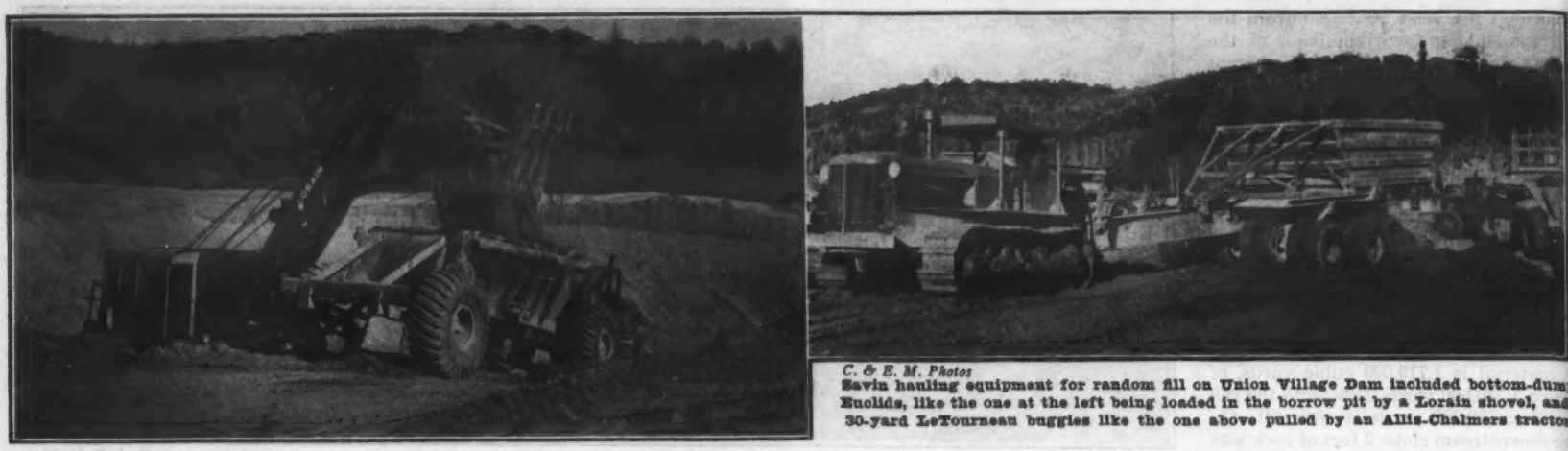

C. & E. M. Photos
Savin hauling equipment for random fill on Union Village Dam included bottom-dump Euclids, like the one at the left being loaded in the borrow pit by a Lorain shovel, and 30-yard LeTourneau buggies like the one above pulled by an Allis-Chalmers tractor.

Dirt-Movers Build Union Village Dam

(Continued from preceding page)

yards. As it was dumped on the slopes, the rock was leveled off by dozers.

Placing and Compacting Fills

Hauling equipment for the impervious, random, and pervious types of fill included a great variety of dirt-movers, both fast and slow-moving units. Largest on the job were 3 LeTourneau sliding end-dump buggies with a 30-yard capacity each and moving on 16 rubber-tired wheels. Two of these units were pulled by Allis-Chalmers HD-14-C tractors, and the third by a Caterpillar D-8. A fleet of 15 bottom-dump Euclids, holding 14 yards, were next in capacity size on these hauls from either the borrow pits or excavation areas. In addition to the shovel loading, a Euclid and a Haiss loader worked in the borrow pits.

The list of earth-movers included 8 Super C Tournapulls with LP 12-yard Carryalls which were helped in loading at the borrow pits by 2 Allis-Chalmers HD-19 tractors. The tractors were equipped with poles for snatch loading, and also with blades for push loading. Three 12-yard Tournatrailers were still another type of dirt-hauler in this well rounded equipment fleet. Besides the tractors already mentioned, the Savin Construction Corp. had 7 Caterpillar D8's, an International TD-24 and a TD-14, and another Allis-Chalmers HD-14. Equipped with dozer blades or rock rakes, they looked after the necessary dozing, made passes for the compaction, or pulled around over the fills two dual sets of Euclid sheepsfoot rollers.

The impervious and random material was put down in 6-inch lifts and compacted with at least six passes of the sheepsfoot rollers exerting a pressure of 450 psi. The pervious sections were placed in 9-inch lifts, and as the sandy material was dumped it was thoroughly wet down with water pumped from the river and passing through a 2½-inch hose. It was rolled with four passes of a 20-ton tractor. The compaction of the material in the embankment ranged from 90 to 95 per cent of modified Proctor density.

Two 10-Hour Shifts

For 20 of the 24 hours in the day, the big fleet of equipment moved ceaselessly from pit and cut, up graded ramps to the top of the rising embankment. A Caterpillar No. 12 motor grader kept the haul roads in good shape. As the dam was attaining its final height, the crown naturally narrowed down and reduced the working space for the big earth-movers to maneuver in. The traffic of the huge machines made the top of the dam resemble a busy street intersection in a large metropolis, with a constant flow of vehicles back and forth. But skilled planning and direction by those in charge of the construction, together with the experience of the well trained equipment operators, kept the machines running along smoothly; there was a minimum of delay in dumping loads and getting off the embankment on the return trip for more material.

Beginning in July two 10-hour shifts were worked. The first shift was from 7 a. m. to 5:30 p. m., and the second from 6:30 p. m. to 4:30 a. m. the following morning. A half-hour lunch period was included in the first shift, but during the night shift the men generally ate right on the job. Lighting was provided by Navy-surplus light units mounted on trucks and by a Caterpillar D2 generating unit. The equipment worked six days a week, and the average daily production including both shifts was 12,000 cubic yards. The best day's work was 16,000 yards.

During the initial construction season of the earth embankment, the contractor was required to complete the dam cross section only up to elevation 580. But with mild weather prevailing during the late autumn, the placing of the big fill continued up to the top elevation of 584. Good progress was also made on the rock work, but some of this was left to be finished in 1949. While the dam was going up, five observation wells were dug into the embankment within the lines of the former riverbed; three of these wells were along the axis of the dam. After the

(Continued on next page)

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Also Available: 16' Elevator (Same Design)

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You eliminate stakes, complicated holding harness and expensive hand labor, and are assured of perfect alignment with this Flex-Plane installer. Job tested for three years, this machine has demonstrated substantial savings in time and money. Let us tell you how—write today to Flex-Plane, Warren, Ohio, for Bulletin J-105.

- ADJUSTABLE TO VARIOUS DOWEL SPACINGS
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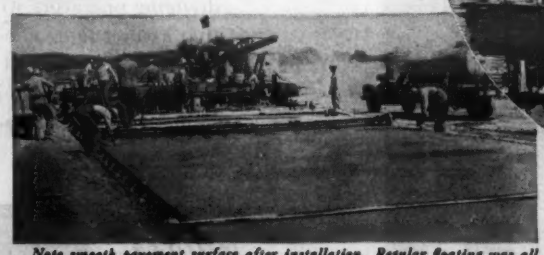
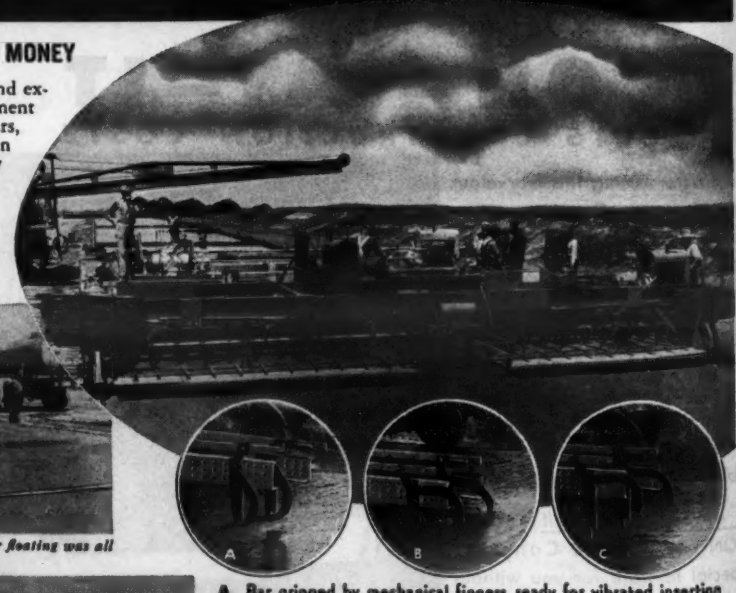


Note smooth pavement surface after installation. Regular floating was all that was required.



A. Bar gripped by mechanical fingers ready for vibrated insertion into plastic concrete. Tie-bars and dowels easily insert into fingers.
B. Bar has been worked, by vibration, to pre-determined depth. Rear holding finger was disengaged as bar started through concrete.
C. Completed operation. Vibrated removal of fingers assures complete seal of plastic concrete. Surface disturbance is minor.

FLEX-PLANE
WARREN OHIO

C. & E. M. Photos

A 17-yard end-dump Euclid (left) unloads rock protection on the upstream slope of Union Village Dam. Euclid sheepsfoot rollers pulled by a D8 (above) compact embankment.

Speedcrane with a 1-yard clamshell bucket dug the vertical holes for the wells, 5-foot lengths of 3-inch pipe were inserted into them.

Equipment Maintenance

Equipment was serviced in the one-hour period between the day and night shifts, and again in the 2½-hour interval between 4:30 a.m., when the night shift ended, and 7 a.m., the start of the day shift. Maintenance men were on the job the entire 24 hours. After each shift, equipment was greased in the field by a Lincoln lubricating unit mounted on a Ford truck. The machines were also fueled in the field from a 1,700-gallon diesel tank mounted on an Autocar. Fuel oil was stored on the job in a 9,000-gallon tank, which was kept supplied with Esso oil shipped from Boston in tank transport trucks.

A maintenance shed was set up on the job, and heavy parts were dismantled with the help of a couple of 50-ton chain hoists hung from steel A-frames. Structural repairs were made with three Flex Arc 300-amp electric welders.

Concrete Work

By the summer of 1948 the 143-foot-deep gate shaft, midway in the tunnel, was lined with concrete. At the top, this gate shaft measures 19 x 26 feet, but it increases in size through transitions to 26 x 30 feet as it approaches the tunnel. The shaft contains four gate wells, a float-gage well, and an air shaft. The concrete lining is a foot thick in the float well and air shaft, 2 feet thick at the top of the gate wells, and 4 feet thick at the service gates. The steel framework for the operating house at the top of the shaft was erected by a P&H truck crane with a 45-foot boom. The structure is enclosed with brick walls.

This year, over 10,000 yards of concrete will be poured in the construction of the spillway weir and the concrete gravity-type retaining wall along the downstream left side of the spillway chute. The weir is 388 feet long and from 12 to 15 feet high, with the crest elevation at 564. Built on rock, it provides a 5-foot freeboard above a maximum spillway surcharge of 15 feet for protection of the dam against overtopping during extremely high floods.

The dam will provide a reservoir of 38,000 acre-feet of storage below the elevation of the spillway-weir crest. In

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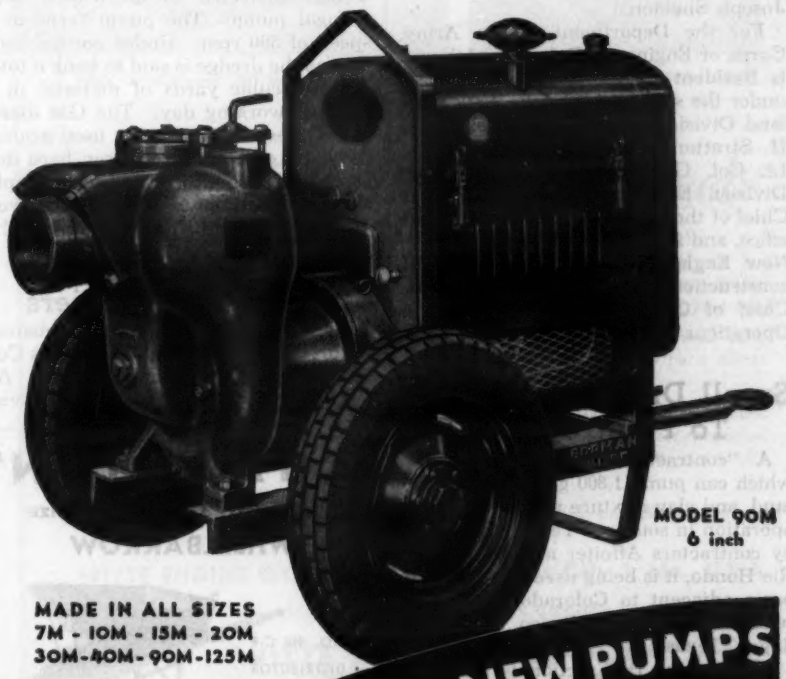

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CHALLENGE ANY PUMP TO MATCH THEIR PERFORMANCE

With a new complete line of Contractors' Pumps, Gorman-Rupp has topped their own past high record of performance with a better pump --

-- QUICKEST PRIMING
-- HIGHEST PRIMING
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Compare them for priming speed:

The new Model 15M (3") primes at 25 ft. suction lift in 61 seconds.

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And the Gorman-Rupp is still the most simple pump --

No ports, no valves, no clean-out plates, nothing to cause stoppages.

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Our distributors are authorized to put a Gorman-Rupp Contractors' Pump on any pumping job, anythime, anywhere, alongside any other make pump, size for size. The Gorman-Rupp pump is guaranteed to pump more dirty water more hours, using less gasoline and to prime quicker than any other self-priming pump. If it isn't the best all around pump, our distributor will accept the return of the Gorman-Rupp pump and pay the user any installation expense incurred.

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Model 310 General ⅜ Cu. Yd. Power Shovel.

Provides Performance Never Before Attainable In Small Type Excavating Equipment

Among the numerous advantages of this new type, crawler mounted GENERAL are 100% air control of basic motions through an air actuated, finger touch lever system . . . "Air Cushion Clutch" on reversing and retract mechanisms . . . bigger, easier operating brakes . . . larger shafts and liberal use of anti-friction bearings . . . deck gears recessed, fully enclosed, and running in oil . . . live, independent, worm driven boom-hoist with power up and power down for Crane, Dragline, and Clamshell service . . . independent travel, two speeds in either direction, steers without stopping . . . drumshaft operates in anti-friction bearings and end is capped with a lifetime, dustproof, GENERAL designed seal.

The GENERAL MODEL 310 is available with independent chain crowd shovel boom assembly, with crane boom for clamshell, dragline, and hookblock work, and as a hoe. Boom assemblies can be changed with a minimum of effort in the field.

●

These new features with the many others provided on the Model 310 give you increased earning power which will pay for the cost of the machine in a very short time. Write for complete details.

POWER SHOVELS • CRANES • DRAGLINES • CLAMSHELLS • BACKHOES • PILE DRIVERS

THE OSGOOD CO. O-G THE GENERAL CO. EXCAVATOR
MARION OHIO

DIESEL GASOLINE OR ELECTRIC POWERED • ¾ TO 2½ CU. YD. • CRAWLERS & MOBILCRANES

Dirt-Movers Build Union Village Dam

(*Continued from preceding page*)

times of flood, water from the 126-square-mile drainage area will be stored by closing the gates in the tunnel until recession of floodwater in the main stream of the Connecticut River permits safe release. During periods of normal flow, the river will follow its present channel through the reservoir area unimpeded, by-passing the dam through the tunnel. The pool area will be cleared in a later contract.

Quantities and Personnel

The major quantities included in this Union Village Dam project are:

Rolled embankment	1,520,000 cu. yds.
Rock excavation, open cut	153,000 cu. yds.
Rock excavation, tunnel and shaft	15,600 cu. yds.
Common excavation, including borrow	2,255,000 cu. yds.
Concrete	22,000 cu. yds.
Reinforcing steel	531,000 lbs.

The Savin Construction Corp. employed an average force of 180 men on the job under the direction of Superintendent L. F. McCarthy, assisted by Joseph Sheldon.

For the Department of the Army, Corps of Engineers, Robert S. Johnson is Resident Engineer. The project is under the supervision of the New England Division, of which Colonel James H. Stratton is Division Engineer and Lt. Col. G. W. Carlson is Assistant Division Engineer. C. J. Murray is Chief of the Operations Division of that office, and is assisted in direction of the New England Division's flood-control construction program by E. H. Brown, Chief of Civil Works Branch of the Operations Division.

Small Dredge Built To Pump 1,800 GPM

A "contractor-made" dredging rig which can pump 1,800 gallons of water, mud, and clay mixture per minute is in operation in southern Texas. Designed by contractors Affoiter and Garnett of Rio Hondo, it is being used to dig a ship basin adjacent to Colorado Canal between the Gulf of Mexico and Harlingen, Texas.

The hull or raft section is made of welded steel with standard ship-deck plating. It accommodates all of the driving machinery in a specially constructed hold compartment. A platform

All "contractor-made", this dredging rig is digging a ship basin adjacent to Colorado Canal between the Gulf of Mexico and Harlingen, Texas. Contractors Affoiter and Garnett designed the dredge.

containing all engine and equipment controls is positioned well above the deck level to afford visibility for the operator during every stage of dredging.

Power is supplied by a General Motors Series 71 diesel engine which is V-belt-connected to an 8-inch centrifugal pump. The pump turns at a speed of 560 rpm. Under normal conditions the dredge is said to bank a total of 1,000 cubic yards of material in a 10-hour working day. The GM diesel also drives a rotary cutter used against the bank or bottom to loosen hard deposits. Five small winches permit rapid and easy positioning of the hull as well as a means of raising or lowering the ladder.

Flexible-Jaw Pliers

Pliers with flexible jaws are manufactured by the Industrial Products Co., 2855 N. 4th St., Philadelphia 33, Pa. As a special feature of the New Twist pliers, the jaws can be shifted to various angles within a radius of 110 degrees. This makes the tool extremely useful in restricted or out-of-the-way areas, says the company.

The New Twist pliers have chrome molybdenum steel jaws and rubber-covered handles. The jaws are serrated to hold securely and to prevent slipping, and a spring action releases them automatically. The New Twist pliers are 10¾ inches long and weigh 8½ ounces.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 110.

Stud-Welding Booklet

Twenty-four picture paragraphs covering as many uses of the Nelson stud-welding gun are included in a new 8-page catalog of manufacturing and construction applications issued by the Nelson Stud Welding Division, Morton Gregory Corp., Lorain, Ohio.

Typical production units and a wide range of special studs are shown, along with a concise description of the Nelson method of fastening them to metal.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 71.

"CHAMPION"
4½ cu. ft. Contractor Size
WHEELBARROW

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Please send literature on the new Dart Vibrator line. I am interested in
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- Efficient WAUKESHA Engine
- Low Maintenance Cost
- Easy to Operate and Steer
- Rugged Top-Quality Construction

You'll find the heavy-duty HERCULES roller you need in this list of models:

Model No.	Description
10D51	10-Ton Roller, Waukesha Diesel 51 HP
10G54	10-Ton Roller, Waukesha Gas 54 HP
12D51	12-Ton Roller, Waukesha Diesel 51 HP
12G54	12-Ton Roller, Waukesha Gas 54 HP
12D51-WB	12-Ton Roller, Waukesha Diesel 51 HP (20" WATER-BALLAST Front and Rear Rolls)
12G54-WB	12-Ton Roller, Waukesha Gas 54 HP (20" WATER-BALLAST Front and Rear Rolls)

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The depth of cut of the HERCULES scarifier is regulated by a specially designed tooth bar supported at each end by gauge wheels. The scarifier is hydraulically controlled.

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BUCYRUS, OHIO • U.S.A.
Builders of WARCO Motor Graders and HERCULES Road Rollers

Basis of the improved Nu-Matic grinder is its pneumatic rubber drum designed to provide a 100 per cent grinding surface the entire width of the abrasive band, eliminate grinder marks, and cover work better. It weighs about 2 pounds.

Feature of Grinder Is Air-Inflated Drum

A special type of grinding wheel with an air-inflated base is announced by Nu-Matic Grinders, Inc., 10304 W. McNichols Road, Detroit 21, Mich. It is suitable for grinding, sanding, or polishing curved, irregular, or odd-contoured shapes, and it can be used on bench, portable, or flexible-shaft motors.

The Nu-Matic uses standard abrasive bands measuring 5 inches in diameter x 3½ inches wide, with grits from 24 to 500. To change the abrasive band, air is released from the pneumatic rubber drum, the band is replaced, and the unit is then reinflated to the degree desired. According to the manufacturer, the unit has great flexibility due to its varied rpm speeds, adjustable drum compression, and the use of varied-grit abrasives. The Nu-Matic is said to be chatter-proof and constructed for heavy duty and long life. It weighs approximately 2 pounds.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 95.

Pipe System Offered As a Packaged Unit

A complete prefabricated pipe system for temporary or semi-permanent installations can be supplied by Albert Pipe Supply Co., Inc., Berry and N. 13th St., Brooklyn 11, N. Y. Available for purchase or rental, these packaged systems are designed for piping water, compressed air, or for similar service. The Speed-Lay package consists of completely prepared pipe, plus Speed-Lay couplings and fittings, plus all valves and other accessories needed.

According to the Albert company, the pipe ends come prepared and ready for installation without special tools or highly skilled labor. They are said to be lightweight, portable, and easy to handle and install. The pipe is offered in diameters of from 2½ to 12 inches or larger if required and in 20-foot sections, with shorter lengths available if desired. The systems are designed for a working pressure of up to 150 psi.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 118.

The Engineers' Credo And Human Relations

Cooperation and understanding in industry, religion, politics, and the home can be secured by the same philosophy that has enabled the engineer to produce his miracles of technology. So said F. Alexander Magoun, Associate Professor of Human Relations at Massachusetts Institute of Technology, at the spring meeting of The American Society of Mechanical Engineers in New London, Conn. R. C. Nyman, Yale Personnel Director, co-authored the speech.

Professor Magoun—who is also President of Human Relations, Inc., Boston—characterized the philosophy of the engineer as basically one of truth, reason, and integrity. It begins with an attempt to recognize and define the problem to be solved, and continues with a sincere search for the applicable laws of the government of nature. By applying the philosophy and morality of science to the engineering of human relations, said Professor Magoun, we can attain happiness, understanding, and cooperation among our fellow men.

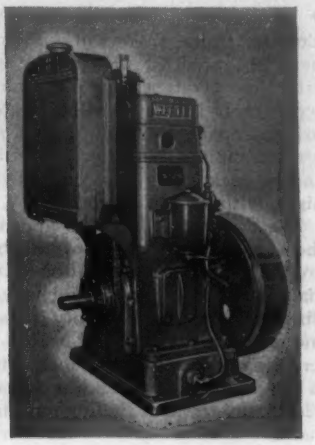
"The engineer's philosophy is relatively simple, yet so incredibly effective he has acquired great confidence that any results he predicts will be achieved. The engineer endeavors to apply his principles in the most effective way, and to discover what he has learned in the application thereof. Thus, the engineer has a constructive and self-correcting method because he has a self-correcting philosophy. If we are not to destroy each other, we must apply the philosophy and morality of science to the engineering of human relations."

Since man is dependent upon his fellow men as he is upon nature, said Professor Magoun, human problems should be approached with as much professional competence as the engineer employs in pursuing a technical problem. But "instead of trying to understand each other, we have endeavored to coerce when we felt strong and to entice when we felt weak. The result has been a false philosophy of human relationships, intolerable relationships of fear, false values, superficial compromises, and dishonesty—which have never led to constructive solutions.

"We do not need better brains. We do not need to change human nature any more than the engineers have changed it. For cooperation and happiness we need only to adopt in industry, in religion, in politics, and in the home . . . the same philosophy which has taken the scientist so far, so fast, in the last 300 years. As before, the first requirement is an honest attempt to find the facts, no matter how disagreeable. As before, this requires rejecting the old dogmas which led us to reach conclusions before we even knew what questions to ask. As before, we need not only the courage to look, but the capacity to see.

"We must search in our homes, our churches, our factories, and our offices for what will stand up under critical examination, and fearlessly reject all else as false. The engineer's professional philosophy has brought about the development of the physical world. It must now be widened in its application to bring about the development of men."

Witte Diesel Power Unit Model BDRC



Witte Diesel Power Unit Model ADRS

Big Values in small diesels

Dollar for dollar, Witte Diesels are the best power investments you can make. They'll deliver reliable power for a few cents an hour . . . year in and year out.

Witte Diesels start at the touch of a button, operate on low-cost diesel fuel, and require only a minimum of maintenance. You don't have to be a diesel expert to operate and service them.

Witte Diesel Power Units are offered from 4 to 12 H.P. And Witte Dieselectric Plants . . . a package unit consisting of a Witte Diesel and a direct-connected or belted constant voltage generator . . . range from 3 to 10 H.P. KVA-AC; 2.5 to 8 KW-DC.

Specify the type of unit and the horsepower or KVA you need. We'll send you specifications, prices and the name of your Witte dealer.

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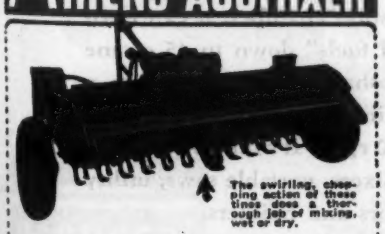

The swirling, chopping action of these tines does a thorough job of mixing, wet or dry.

HERE'S equipment designed especially for mixed-in-place construction—to operate in connection with other general purpose equipment. Whatever aggregates are used it thoroughly pulverizes, mixes and aerates aggregates with binder—rapidly and economically. Also ideal for soil cement stabilization. Sefe . . . made 4 standard sizes, 4', 5', 6' and 7'. Write for details.

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PROMPT SHIPMENT ON ALL SIZES

FEEDERS, STORAGE BINS PUMPS - TIMERS AND OTHER UNITS AS REQUESTED

LITERATURE UPON REQUEST

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FURNISHED COMPLETE WITH INDIVIDUAL MOTOR DRIVES, AND WITH ENCLOSED COLD ELEVATOR, FAN AND BURNERS (EITHER HIGH OR LOW PRESSURE).

CAN BE FURNISHED WITHOUT WHEELS AND AXLES.

COMPLETE TOWER UNITS, VIBRATING SCREENS, HOT ELEVATOR AND BINS, FURNISHED WITH DRYER IF DESIRED.

LARGER SIZES 80 TO 100 TONS PER HOUR (COMPLETE DRYING AND MIXING UNITS) ALSO AVAILABLE

THE F. D. CUMMER & SON COMPANY

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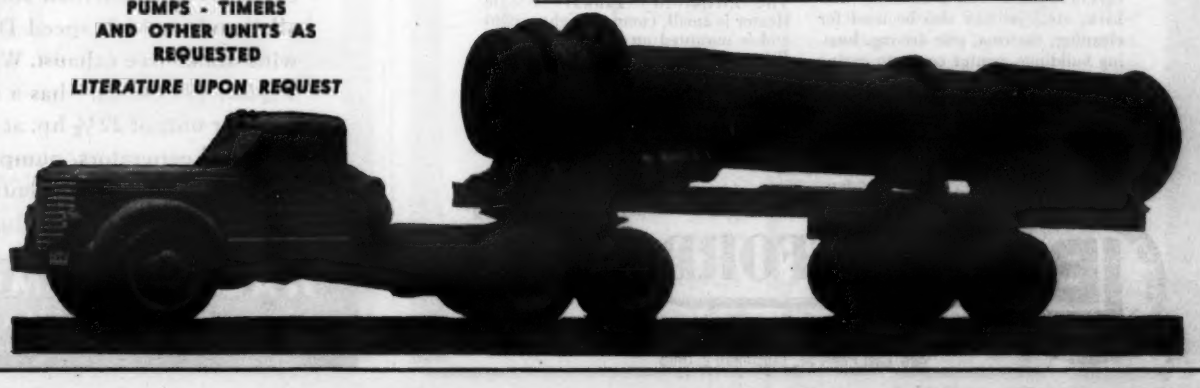

County Mechanizes Bridge-Repair Work

Interchangeable Timbers Make Bridge Repair Easy As Mobile Crews Hurry With Pneumatic Machines

✦ TEN years ago, in Los Angeles County, Calif., men worked long and hard to repair a bridge that needed attention. Today a crew can rush to the scene early in the morning in a special bridge-repair unit, pull out and replace a main timber in a Howe truss bridge, and be back in the Los Angeles yard by night, with the job finished.

The difference is in the approach to the job, because many of the bridges are the same. Mechanization of bridge maintenance has made the change possible. Los Angeles County today has one of the better types of bridge-maintenance organizations. It does not claim to know all the answers, but it has come a long way towards finding out many of them.

The County has developed in its planning offices a special type of bridge-repair truck, which hauls men, materials, tools, an air compressor, and supplies. It has thought up some foolproof labor-saving devices, like a special twisted floor spike that won't pull out. It has minimized maintenance by building more prevention into the new structures. It has developed bridge abutments and piers out of native materials which last for years and years. Exactly how, will be described in more detail later on.

The Job and Its Organization

The bridge job in Los Angeles County is unusual, like California weather. Many of the 450 bridges in the county span streams that are normally dry, thus permitting crews and equipment to do repair work on dry land. Many of these same bridges are subject in winter to raging floods, because the streams they span are steep, and flood torrents rush at high velocity towards the sea, in the rainy season.

Traffic and population are so heavy in southern California that a bridge can seldom be closed during repairs. It is not uncommon to make major repairs while the bridge is held up by falsework. Crews have even built a bridge deck off to one side and rolled it into place on rollers during a lull in traffic.

The spectacular and unusual feats are overshadowed, however, by the routine maintenance. Bridges have now been largely standardized by types, and the interchangeable parts of older-type timber bridges are now prefabricated in a central yard and quickly installed. Compressed air now operates saws, chisels, wrenches, and spike drivers, on jobs which formerly took a strong man's back.

Permanent bridges over major streams like the Los Angeles River are now being built out of steel and concrete to make them last a half century or more. Older-type bridges have long since been standardized. They include the Howe truss structures with 60, 74, and 108-foot spans; 38-foot-span A-frame bridges; 50-foot A-frame bridges; and native-stone and laminated-timber structures. Many of these bridges are today being replaced under private contract by more modern concrete structures as the need arises, but this hardly lessens a big maintenance job.

The maintenance organization is

(Continued on next page)

C. & E. M. Photo
This special bridge-repair truck has done more than any other single innovation to speed up bridge maintenance in Los Angeles County, California. Notice the compressor hitch on the back and the ladder fastened on top.

LITTLEFORD
Tankar STEAM HEATER
model no. 115
provides steam in two minutes time

FROM A COLD START Here's a steam producing unit for Unloading Tank Cars that gives 200 lbs. of steam pressure in two minutes time. It is the fastest steam producing unit on the market today. It's designed to unload tank cars of Asphalt, Tar, Emulsions, Cutback, etc., yet can also be used for cleaning, thawing, pile driving, heating buildings, winter concrete curing and ore mining.

COMPLETELY AUTOMATIC—there's no steam producing unit that heats as fast, is as safe and foolproof as the "Tankar" Steam Heater. It's automatic in feeding the water, stopping the burner, controlling the temperature and steam output and lighting the burner. The Littleford "Tankar" Steam Heater is small, compact, light weight and is mounted on Pneumatic Tired Wheels for fast trailing. Secure more information on this amazing steam producing unit from your nearest Littleford distributor.

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● Get BULLETIN 1410 . . . you'll want to know all about this unusual Diesel power package. Outstanding in its lively pick-up and quick response to power demand—a small four Diesel that's really smooth running and free from vibration. Because of its exclusive and patented combustion chamber, it can burn all "modern high speed Diesel fuels" down to 45 cetane with smoke-free exhaust. Waukesha 180-DACU—$3\frac{5}{16}$-in. x $3\frac{3}{4}$-in., 129 cu. in.—has a maximum continuous rating as a power unit of $22\frac{1}{2}$ hp. at 1800 rpm. It's *the power plant* for small generators, pumps, mixers, portable saws, utility plants on oil rigs; for contractors and builders.

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WAUKESHA MOTOR COMPANY
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C. & E. M. Photos

Older-type bridges in Los Angeles County have been standardized—like the A-frame timber bridge above. And permanent concrete bridges—like the one at right—across the Los Angeles River—are being built over major streams.

headed by M.I.T.-educated O. F. Cooley, Los Angeles Road Commissioner, with Sam R. Kennedy having general supervision of the program as Bridge Engineer. Mr. Cooley is one of the venerable men of county engineering, having been with Los Angeles County for a period of 30 years and done other jobs in mining and electrical engineering before that, in his younger days. Administrative, design, construction, and maintenance are the four sections under Mr. Kennedy, headed by C. F. Galloway, P. E. Thompson, J. J. Fahey, and L. M. Wellington, in that order. E. A. Burt is the Chief Deputy between Cooley and Kennedy.

Loren M. Wellington, Bridge Maintenance Superintendent, generally handles field and yard operations. He has an assistant and a bridge maintenance inspector. Under the jurisdiction of this department come rented-equipment activities, transportation, the stockroom, the office, and general maintenance. Bridge construction by contract is handled under Mr. Kennedy, but in a separate section.

Bridge maintenance includes an 18-man yard crew, a 13-man specialist bridge-substructure crew, a 15-man specialist superstructure crew, a 16-man prefabrication crew, and a 15-man miscellaneous or bull crew. Each of these crews works under a foreman. Nine detention camps in Los Angeles County also furnish some prison labor for work on bridges, principally in the mountainous areas.

The crews are so organized that they can switch jobs at a moment's notice, as the needs of the system dictate. Recently, when bridge designs were suddenly changed at Long Beach and Saugus, 80 miles apart, the crews and their equipment were all interchanged in 24 hours. This involved the transfer of a pile driver, among other pieces of equipment.

With the exception of a working arrangement on equipment repairs—which allows bridge-maintenance equipment to be repaired in the district shops of the Road Department—all bridge operations are controlled from the Road Department's central yard at 1636 Eastlake Avenue in Los Angeles.

Special Repair Truck Devised

The one single innovation above all others which has promoted efficiency has been the invention of a specialized bridge-repair truck. The Bridge Department now has three: a General Motors and two Brockway trucks with the special bodies designed by the county. But let's let the men who thought it up tell about it.

Kennedy said, "All we knew in the beginning was the fact we had a problem on our hands. Ordinary trucks weren't satisfactory. Our crews need so many tools to repair a bridge that they were forever forgetting to bring them all along."

"So it seemed to resolve itself in the development of a special self-contained unit," Wellington explained.

"How did we go about designing the body?" Kennedy repeated. "Well, it wasn't too hard. We just made a careful inventory of the things a crew ought to have with them every day. Like chain saws, spike drivers, rope, blocks and tackle . . ."

"And circular saws, air drills, bits, bars, carpenter tools, paint, brushes, kerosene and lanterns, turpentine, linseed oil and gasoline," Wellington interjected.

Kennedy said, "We even keep an Oster 502 Pipe Master in one compartment of the truck, so we can thread bolts in the field if we have to.

"And man, what a job it was to put *that* machine in!" Wellington exclaimed. "Originally it had an electric motor. We had to replace it with air because we always have air on a job. It was easy enough to find an air motor, but we needed one that would reverse itself—otherwise you could never get a bolt out of the machine after you got it threaded. We finally found the type we needed on a special drill—and improvised from there."

After they had completed their inventory, Kennedy and Wellington recorded the dimension of the various tools and built the rig around them. No space in the van is wasted. Short tools go in short compartments, long tools in long compartments, and they were planned to come out even all the way around. In addition to the tools mentioned, the rig carries a pneumatic hack saw and a supply of special washers, spikes, tie-down plates, and other miscellaneous small items every bridge-repair crew ordinarily uses in the course of a day's work.

Each truck has a front-end winch to assist in moving heavy objects, or to help the truck through a bad place in a riverbed. A trailer connection on the back permits each unit to tow other equipment such as carrying and tilt-bed trailers, air compressors, portable electric plants, etc. The crews are never without the air compressor. They have now rigged up some tools large enough to unscrew the big nuts on the bullrods of bridges, using their standard impact wrench guns.

Designed for efficiency and comfort, each truck will haul a crew of 10 men and a foreman without crowding. The

(*Continued on next page*)

General
General Wheelbarrow Co., Inc. Wichita, Kansas

Engineered and built to wheel easier and last longer. That's why GENERALS are first choice.

★ Now available at competitive prices.
★ Leakproof, 16-gauge steel trays.

Brick and tile, foundry and industrial steel handle models available. Write for the name of your nearest distributor.

"The Wheelbarrow with Orange Handles"

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If you handle big paving jobs—The low-cost Dumpcrete can pick up from your paver for off-the-slab pours . . . culverts, bridges, turnouts, sidewalks, curb-and-gutters.

About the Dumpcrete—It's a non-agitating concrete body designed especially to haul air-entrained concrete (a must for extra durability and workability). The Dumpcrete costs less to buy, to run and to maintain. It loads fast and places fast. Learn how it can cut your costs. Mail the coupon today. There's no obligation.

The lower cost Dumpcrete is lightweight, watertight, with 13-foot chute, controlled higher discharge and lower center of gravity. Hauls sand, gravel, and coal too. Available in 2, 3, and 4 yard sizes.

Send me facts about the cost-cutting Dumpcrete for paving work.

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DUMPCRETE
DIVISION, MAXON CONSTRUCTION CO., INC.
539 Talbott Bldg., Dayton 2, Ohio

C. & E. M. Photo
Bridge Superintendent L. M. Wellington inspects a long Howe-truss timber bridge across the Los Angeles River. Regular monthly inspections detect future maintenance needs.

County Mechanizes Bridge-Repair Work

(Continued from preceding page)

driver's cab was enlarged, and seats installed for the crew. The cab also has a small table so the foreman can make his reports and study plans.

The work on these trucks was done by a commercial trailer-body company in Los Angeles, which worked to the plans made up by Kennedy and Wellington.

Each compartment can be locked—in fact, each compartment is always locked when not in use—by a system of Best locks. Many combinations are possible on Best locks. Mr. Cooley has a key which will unlock any lock on any equipment of the Los Angeles County Road Department. Kennedy's key will unlock anything in the bridge division. A bridge foreman's key will unlock anything assigned to bridge maintenance, but he cannot unlock, say, a resident engineer's office on new construction by contract. The system has eliminated confusion entirely, and there are now no more hack-saw activities on hasps in emergencies.

The Best locks are used not only on bridge trucks, of course, but are universal throughout the County Road Department.

Prefabrication Work

Since so many of the structures are standardized, dozens of structural members are similar. It is therefore desirable to pre-cut these timbers, drill the holes, treat the timbers, and store them in the yard for use.

The maintenance yard is currently undergoing a face lifting to facilitate this process, although it carried on during the war with makeshift equipment. When present alterations are made, the yard will have a sawmill set up on an assembly-line basis. Timbers can be cut to size, sent on rollers to a power planer, and thence to a table where drills with 114-inch radial routers can drill the holes over a wide radius.

Powered by Caterpillar diesel engines, the sawmill was purchased in a war-surplus sale at Port Hueneme, Calif. It was left over from the supplies of Seabee battalions during the war. Wellington, who says he was a chief warrant officer with the 76th and 91st Seabee Battalions, knew of much of this equipment from his service experience.

The sawmill, planer, and drills were set on permanent concrete foundations as soon as they arrived, and they have already turned out a lot of work even though the yard is not paved and the set-up is not quite complete.

Timbers were scarce when the sawmill was purchased, so the County bought a selected quality of timber from the Cal-Ship shipways which were being dismantled at the time. This provided a large supply of heavy timber, most of it good except for some spike holes.

The top 6 inches is slabbed off first, leaving the rest of the timber relatively clean so that it can be cut to the size desired. Timber members are then cut, planed, drilled, and finished. The holes are drilled before the timbers are treated so there will be no raw wood exposed to the elements.

Finished timbers are trucked to commercial timber-treating plants in Los Angeles, where the wood is treated with hot creosote under pressure. The Wolmanizing process is also used, though not as extensively as the creosoting. Even the wooden members of truss bridges are creosoted, making them blend in nicely with the bituminous highways of the county. This has also reduced the size and expense of the painting job, for bridge superstructures were formerly painted white.

Stored in the yard, the timbers are available in quick order. Recently a crew got a hurry-up call to replace a damaged timber on a bridge near Saugus. They were back the same day with the job done.

When a timber bridge is replaced by more permanent concrete, a great deal of good timber is salvageable. This timber is run through the sawmill to make standard sizes of lumber which are always in great demand.

No records are available now, but the engineers believe that the present timber bridges, well creosoted, may last 40 years.

New Short Cuts Developed

Over the years, the crews have developed a number of clever tricks, all of which make for efficiency and speed.

Formerly, when a crew wanted to replace a cap timber, for example, they had to jack up the deck until the drift bolt was in the clear. Now they jack the deck up only about an inch. A man quickly sticks the blade of a pneumatic hack saw in the crack, cuts off the steel bolt, and the timber can be easily rolled out. Simple.

C. & E. M. Photo
With a Lorain Moto-Crane, leads, and a Vulcan hammer, wood piling is driven under a Los Angeles County bridge.

Reinforcing steel mats for bridge decks, where the decks are of concrete, are made up on jigs in the yard, and the mats then trucked to the job. Steel form panels, which can be used over and over, are made up the same way.

Deck spikes used to give a lot of trouble. A heavy load on a bridge would invariably deflect the deck just enough to pull the spikes at the cross intersections. These spikes would then come up, ruin some motorist's tire, and there would be hell to pay.

A commercially produced twisted spike was found. Driven in with pneu-

(Continued on next page)

SAFETY EQUIPMENT FOR ALL INDUSTRIES

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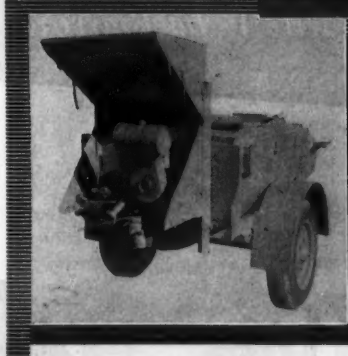

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Standard Steel Works NORTH KANSAS CITY, MO

C. & E. M. Photo
Bridge Maintenance Superintendent Wellington (left) and Bridge Engineer Kennedy inspect a bridge abutment and wing wall where random small timber has been used with steel H-beams to make a neat-looking surface.

matic guns, these spikes could not be pulled out whatever the load. But the heads were small enough to pull through the timbers. A large metal washer was then developed to fit under the head, and nothing will now pull them out. The problem is solved.

The crews made up a plate and eye of steel, to be used below the deck to fasten the deck structure to the piles. With this simple precaution, not a bridge deck has been lost because of loads in a long time. The plate is fastened to the pile with bolts and malleable-iron shear plates. A bolt leads from the eye up to the bridge deck, or to a similar fastening on the deck members.

A special connector for Howe trusses and A-frames has also been made. It is used to connect the floor beams with wind braces on the side. Instead of a flat connecting surface, a toothed groove is made in the timbers with a grooving tool, and the braces are there to stay.

Flexible metal guardrail is being used as well as laminated wooden rail. The metal rail is fastened to heavy posts about 14 inches above the deck so that, except in unusual cases, it will bounce a car in collision with it back onto the road. Heavy wire netting is stretched along the back of the posts so that pedestrians will not fall through. This makes a guardrail which requires little maintenance except painting, under normal conditions of traffic. Armco Flex-Beam and Tuthill guardrail are two types used on bridges and approaches.

What promises to be one of the most effective tricks of all is a type of abutment inclosure which utilizes scrap and small sizes of lumber from the sawmill. For an abutment of this kind, 10 or 12-inch steel H-beams are driven on 7-foot centers. Creosoted lumber cut 6 feet 8 inches long is then built up by laying the pieces on top of each other inside the H-beam flanges; 2 x 4's, 2 x 6's, 3-inch, 4-inch or any random width of material can be used. The lumber is placed with a smooth face outside, and it makes up into a good abutment protection. The small-dimension timbers are practically saturated with creosote, and are really better than larger ones.

Short lengths can also be worked in by nailing the boards through where they butt together, both above and below. The nails hold the joint in place between the solid boards above and below. This abutment trick has given an outlet to the small-sized by-products of the sawmill and salvage operations, and it makes protection for an abutment which will resist fast water with minor maintenance.

Rubble masonry and concrete bricks are used extensively for abutments and

(*Concluded on next page*)

C. & E. M. Photo
Armco Flex-Beam guardrail gets the once-over from Los Angeles County Bridge Engineer Sam R. Kennedy.

BELLOWS-TYPE CARTRIDGE SHAFT SEAL A RICE PUMP FEATURE

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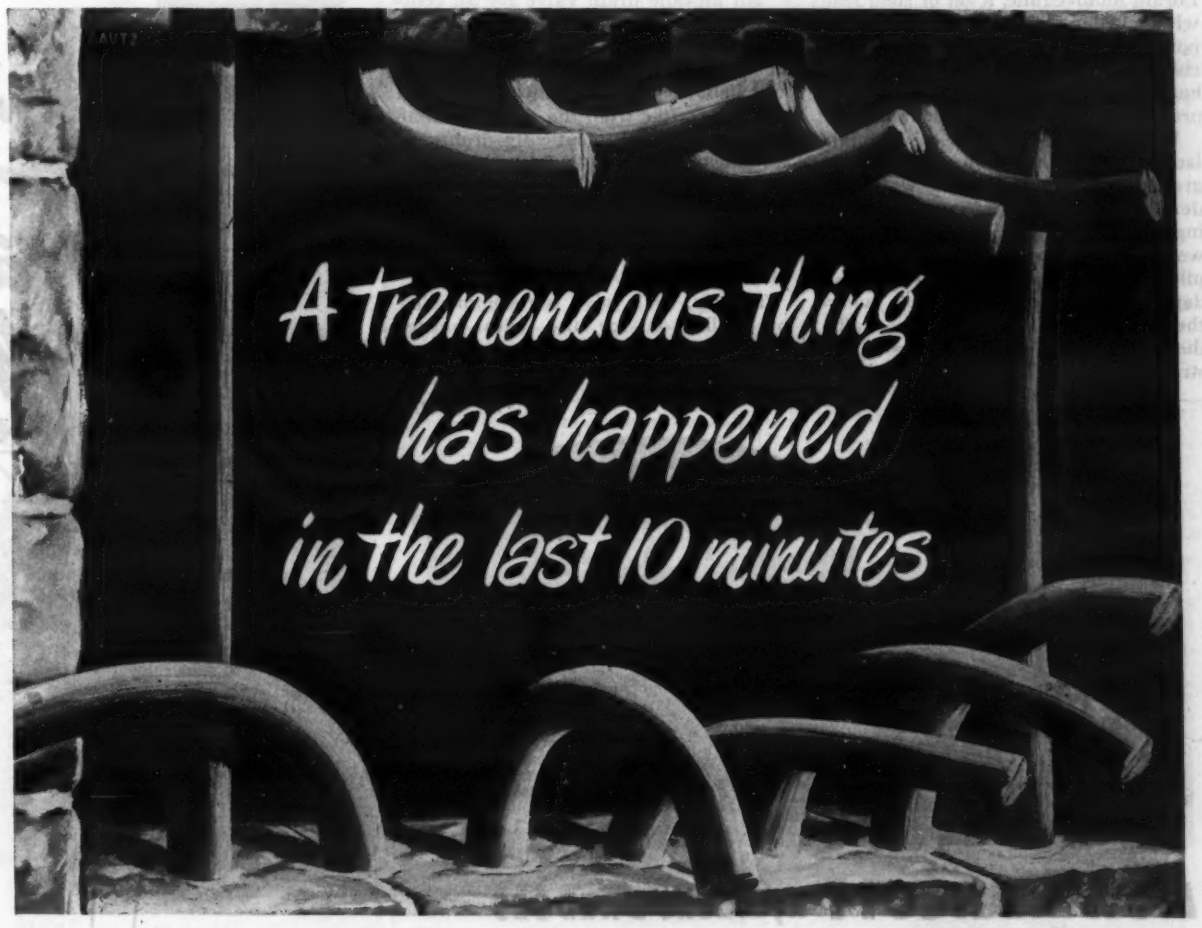

They say dictatorships are new and revolutionary... Actually, they're as old as time itself!

For thousands of years, most of the human beings who have peopled the earth have lived as the slaves or subjects of someone else.

The thing that is new and revolutionary and yours, is *freedom.*

Freedom to choose your job and to bargain collectively, knowing that in America there's no ceiling on advancement.

Freedom to invent new machines . . . and new ways to make them productive . . .

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Compared to the record of all civilization, this free way of yours is ten minutes old!

Yet in ten short minutes it's done *more good for more people* than anything that ever happened on earth.

In war, it enabled you in America to outproduce the rest of the world combined.

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Dying? We've just begun to live! We've just escaped from prison. If the way we live is ten times richer than theirs, that's not enough.

We can make it better still. We can eliminate the faults which remain. We can level off the sharp ups and downs of prices and jobs. We can make the final attack against poverty.

Today, the world is depending on us because we have depended on *ourselves.* Let's show others how that system works!

We can—if we'll work together and build together as Americans always have.

Let's keep on building. Build for Freedom . . . build for peace . . . build for a better world!

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MAIL THE COUPON to Public Policy Committee, The Advertising Council, Inc., 25 West 45th Street, New York 19, N. Y.

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County Mechanizes Bridge-Repair Work

(*Continued from preceding page*)

piers on prison-camp work. The prisoners now use concrete bricks in lieu of standard forms, both for pier and abutment work. The concrete bricks are laid up on the form line about 2 feet high one day. The next day, a concrete mixer goes to work, and the concrete core is placed. Then 2 more feet of bricks go in, and the process is repeated. When the abutment or pier reaches its final height, a mortar finish is sacked on the concrete bricks. This type of bridge construction is particularly effective in the detention camps, where experienced carpenters are hard to find.

Pile-Driving Work

No bridge-maintenance chronicle would be complete without the story of the pile-driver men. This group of men, known as the substructure crew, does all pile driving, sets caps, and builds bridge abutments or repairs them.

Pile-driving equipment consists of a Lorain Moto-Crane, a set of steel leads which fasten to the rig at the boom point sheave and the base of the machine, a Vulcan 30-C double-action pile hammer, and a Joy 630-cfm air compressor which powers the hammer.

Wood and steel piles are driven regularly. The machines operate from the ground, or from cribbing if water underneath makes it necessary. Pile driving is not a random operation. The crew works the year round, and when driving piles, will drive an average of 15 piles a day. On one bridge-repair job, where the bridge had to remain open to traffic, they took the crane underneath the structure and drove short lengths of steel H-beams, welding the sections together as they went in the ground.

A pneumatic Ingersoll-Rand pump is standard equipment with the pile-driver crew, for ground-water conditions can often be overcome with a little pumping. A number of 2, 3, 4, and 6-inch gasoline-driven foundation-dewatering pumps are also available.

When the pile-driving crew finishes a job, it moves on to the next, leaving the superstructure work to the specialist crew which lays the top timber framework, the deck, and guardrails.

Building and maintenance work follows a definite policy, whether on a 1,200-foot Ramona Boulevard job, or a short 30-foot bridge over a dry wash. Abutments, approaches, and decks are all designed and maintained in such a way that the passing motorist does not realize he is on a bridge. A crew which gets this result is made up of real bridge men.

Valve for Draining Compressed-Air Lines

An air-line drain valve for all compressed-air applications where dry air is needed is made by Wilkerson Valve, Inc., 260 S. Dale Ct., Denver, Colo. The No. 1001, says the company, removes all foreign matter from the line each time air is used. It automatically drains off all moisture and oil that may have collected in the line, together with dirt, dust particles, rust flakes, or other abrasive matter. It will handle up to 44 cubic feet of air per minute at pressures of 100 pounds.

The No. 1001 valve is recommended by Wilkerson for use with impact wrenches, drivers, rotary grinders, spray guns, and other construction tools and equipment. It has only one moving part, and no filter element.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 120.

Engineering Laminates

Engineering laminates are discussed in a 797-page book published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. The book was edited by Albert G. H. Dietz, Associate Professor in the Department of Building Engineering & Construction, and Director of the Plastics Research Laboratory, Massachusetts Institute of Technology.

The book tells what laminates are and how they are constructed; how laminate construction is designed; and what are the properties, uses, and advantages of these materials. The stress is on factual and technical information, arranged so as to be easily located. Professor Dietz was assisted in preparing the book by 24 experts, each of whom discusses a particular phase of laminate engineering. "Engineering Laminates" contains 353 illustrations and sells for $10.00 a copy.

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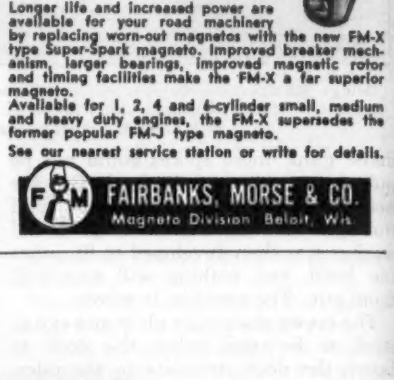

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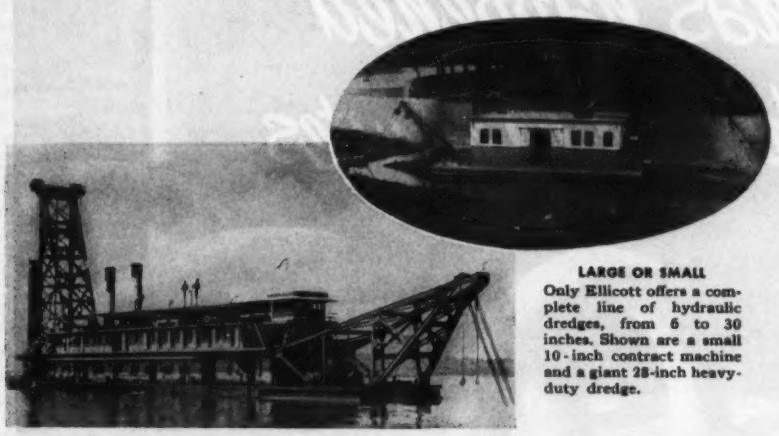

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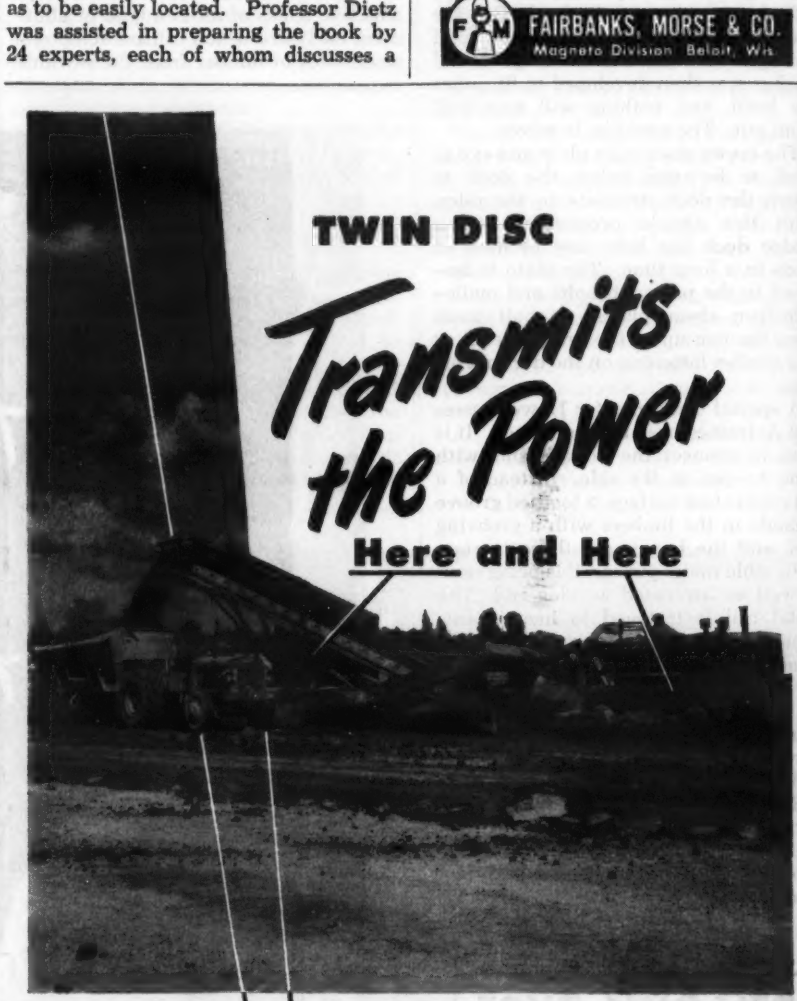

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The Twin Disc Hydraulic Torque Converter (Lysholm-Smith type) assures more work from the tractor because it automatically holds the horsepower output of the HD-19's engine near maximum. Longer life of the tractor results from elimination of shocks and gear shifting; and this smooth operation makes the job easier for the operator.

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Write the Hydraulic Division for Bulletin 135-C on Torque Converters or the Twin Disc Racine Office for Bulletin 129-C on Power Take-offs. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

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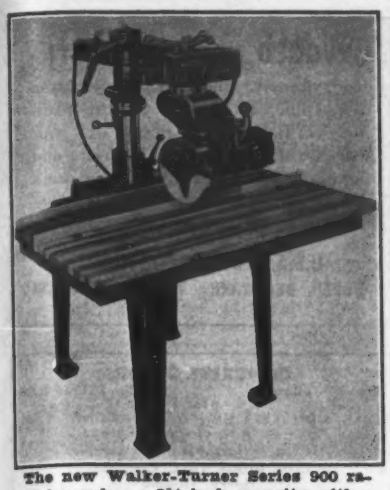

The new Walker-Turner Series 900 radial saw has a 3⅛-inch capacity with a 9-inch blade.

New Radial Saw Has A 3 1/8-Inch Capacity

A 1½-hp floor-model woodworking machine is manufactured by Walker-Turner, Division of Kearney & Trecker Corp., Plainfield, N. J. The Series 900 radial saw has a capacity of 3⅛ inches when using a 9-inch blade. Its special feature is the Centr-Pivot offset yoke designed to permit all cuts to be made in the table area.

Other features claimed for the unit by Walker-Turner include a geared motor with a 2½-times overload capacity, 24-inch crosscut travel, full work visibility, and a laminated hard-maple table top measuring 46 x 24 inches. The manufacturer points out that the saw rips to the center of a 48-inch panel and that it can be used for making all types of cuts, including ripping, dadoing, mitering, beveling, shaping, routing, tenoning, grooving, ploughing, and others. The complete unit is 67 inches tall, has a table height of 32⅛ inches, and requires a floor space of 4 x 5 feet.

Further information may be secured from the company. Or jot down No. 133 on the Request Card at page 16.

Bucket Attachment For Wheel Tractors

A scoop-bucket attachment for use with Ford tractors is manufactured by the Hackney Iron & Steel Co., Cherokee at 2nd St., Enid, Okla. It is designed for digging, carrying, or leveling operations. A forward-tipping device adapts it to use in loading trucks, pouring concrete into high forms, and other uses where a 15-degree leaning angle is necessary.

The Hackney bucket has a capacity of 8 cubic feet. It is hydraulically operated, and is said to lift loads of 1,000 pounds to a height of 8 feet 10 inches at a speed of 55 fpm. When empty, the bucket can be lifted at speeds of 68 fpm. With the bucket lowered, the unit has an overall height of 75 inches; with it raised, 125 inches. The independent hydraulic system delivers 5 gpm at a maximum pressure of 1,500 pounds, says the company. The Trac-Lift unit has a net weight of 760 pounds. For use with it, Hackney also manufactures a set of 24-inch-long fork arms.

Further information may be secured from the company. Or jot down No. 134 on the Request Card at page 16.

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1"	2.50	3.75	7.50
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1½"	4.00	6.25	12.50
2"	(Cotton Rubber Lined)	9.50	17.00
2½"	(Cotton Rubber Lined)	11.50	20.00
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½"	3.75	7.50	$1.50 set	$2.00 set	$1.40 set	1.00 set
⅝"	5.00	10.00	1.50 set	2.00 set	2.70 set	1.50 set
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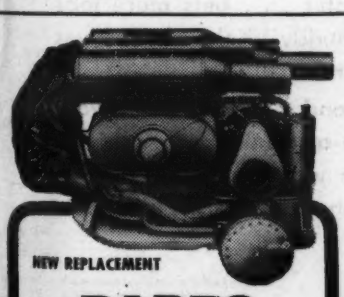

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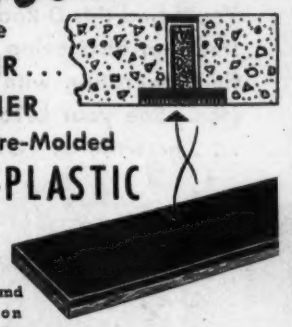

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"There's nothing like it," says Contractor L. R. KOHL

"D ROADSTER moves dirt cheaper and faster than any other piece of equipment I've ever owned"

Roy Kohl, Springfield, Ohio contractor, had a 45,000-yard contract on industrial plant site at Yellow Springs, Ohio, which involved a lot of scattered, small-yardage assignments. Sloping field had to be leveled for the new factory . . . railroad siding graded . . . and reservoir excavated, with 1600-foot-long retaining wall, for the plant foundry.

Contractor Kohl needed a medium-size, high-speed dirt-mover for lowest-cost operation . . . his LeTourneau Distributor had the answer . . . a 25 m.p.h. D Roadster.

"For this type of work, there's nothing on the market like it," says Roy Kohl. "Working side by side, on either long or short hauls, my D Roadster moves dirt at lower cost per yard than my tractor (107 h.p.) and 8-yd. scraper combination. The 'D' moves dirt cheaper and faster than any other piece of equipment I've ever owned!" Check its performance record for yourself . . .

"D" equalled crawler-scraper production on short 400' cycles

On short 400' cycles, Kohl's 100 h.p. D Tournapull self-loaded 5.5 pay yards each load . . . averaged 25 loads (137.5 pay yards) per hour. That equalled the production of the bigger 107 h.p. crawler and 8-yd. Carryall, which averaged 17 trips, 136.8 yards for the same period. Short hauls like this used to be considered a profitable "zone" for crawler-tractor rigs only!

Moved 12.5% more yardage on 1900' round-trip hauls

On 1900' round-trip cycles, the fast, rubber-tired "D" made 16.5 trips to the crawler's 10 . . . moved 90 pay yards an hour to the crawler's 80 . . . an increase of 12.5%. And that's not all. Kohl has found that his Tournapull's 25 m.p.h. speed gets it from job to job faster . . . gets more jobs done. It's so handy, Operator "Buddy" Kohl often drives it 2 miles into Yellow Springs for lunch!

You'll find this D Roadster a time and money-saver on your small-lot dirtmoving . . . you can also use it profitably in fleet operation with a pusher on your bigger production jobs. See your LeTourneau Distributor for complete facts . . . or write us TODAY.

Tournapull-Carryall—Trademark Reg. U.S. Pat. Off. 2144-o

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Please send D Roadster information: ☐ Specs ☐ Price ☐ Delivery

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MORE WORK PER HOUR WITH RUBBER-TIRED POWER